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Tuning Journal for Higher Education

Academics, programmes, and methodologies for fostering students' competences

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Tuning Journal for Higher Education (TJHE), Tuning Journal in short, is an international peer-reviewed journal publishing in English original research studies and reviews in all aspects of competence-based, student-centred, and outcome-oriented education reforms at university level across the globe. It is a joint initiative of the University of Deusto (Spain) and the University of Groningen (The Netherlands) that is run by the Tuning International Academy (http://tuningacademy.org/): an international meeting point for fostering innovative teaching, learning, and research in higher education.

The main goal of the Journal is to promote quality research into the 'Tuning Methodology' for designing, implementing, and assessing context-sensitive degree programmes and to subject the tools developed during Tuning projects and other educational projects to full academic scrutiny and debate among students, teachers, policy makers, administrators, and academics across societies, cultures, professions, and academic disciplines. To this end, the Journal invites applications for thematic issues, conference proceedings or monographs from all stakeholders. Guidelines for the preparation and submission of manuscripts are appended to this Issue and available at the web of the Journal: http://www.tuningjournal.org/

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Contents

Editorial

Editorial: Academics, programmes, and methodologies for fostering students' competences

Luigi F. Donà dalle Rose
Editor

Anna Serbati
Assistant Editor

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As you may remember from our first Editorial (Volume 3, issue No. 1, November 2015), one of our aims was to put "a continuing effort" in order to include our Journal in international abstract and citation databases of peer-reviewed literature. Accordingly, the Editorial Team which includes Editor, Assistant Editor and Managing Editor (Dr. Ladislas Bizimana Kayinamura), applied for inclusion in SCOPUS and in WoS–Web of Science. We are now happy to announce that, after a process involving nearly two years, our Journal has been accepted for inclusion in SCOPUS on September 9th, 2018. The evaluation of the second application is still in progress.

On this occasion, we warmly thank the Editorial Board for continuous and concrete support. We gratefully acknowledge the merits of our contributors, reviewers and readers, who in these recent years enhanced the quality of our Journal. The greatest credit must go to all of them and we are also fully aware that the future of the Journal lies in their hands. Please continue to contribute, circulate, cite, comment, and debate! We invite, again on behalf of the Editorial Board, submissions from "*all those working to improve the quality, transparency, transferability and relevance of higher education programmes and who wish to share their experience with the global community via the pages of this journal*."[1]

We remind that in these years the list of contribution topics has been detailed to better cover the many topics in the field of higher education and to attract actors (see http://www.tuningjournal.org/about/editorialPolicies#custom-3).

[1] Paul Ryan, "Editorial," *Tuning Journal for Higher Education* 1, no. 1 (2013): 13.

In the letter from SCOPUS it was written, among several other things: "*the Editorial teams are to be commended for developing the journal across teaching and learning internationally"*. If we include the present Issue, our Journal has covered almost all continents (Oceania is still missing) with nearly 30 *regional* articles and 32 *country-related* articles, out of a total of 69 articles. Moreover, the present Issue hosts for the first time contributions from two BRICS countries, i.e. China and South Africa.

The title of the present Issue is *Academics, programmes, and methodologies for fostering students' competences*. The focus is again "fostering students' competences", but – given the complexity of higher education systems – "fostering" may best occur if the several involved actors are accordingly prepared and if the many intermediate steps are properly taken care of. In other terms, as we all know, the winds of innovation may follow quite different paths for new implementations and actual improvements, according to local situations, country- and time- priorities and according to the good will of actors.

Indeed, the present Issue starts with the assessment made among some U.S. history academics on the impact of the paradigm shift in teaching and learning brought about by the Tuning and other projects. Next, a quite comprehensive overview of the innovative changes occurring in the field Engineering Education in China in recent years is presented (a most important step at discipline and programme level). The following article deals with the challenge of measuring with a compact operational tool the quality of a degree programme and at the same time the quality of its component units (an innovative step for programme planners and evaluators, carried out in Japan). Then, an experience aimed at re-designing a fourth year of the Bachelor of Education in a South African university on the basis of a constructive alignment methodology is described (again a step at programme planners level).

The conclusive article in this issue is quite different from the others and deals with the possible global role to be played by universities as institutions for research, education and any other *third* mission, in our quickly changing world. We hope that the fundamentals extensively described in this paper may start a fruitful debate among readers and potential future authors.

The first article of the present Issue, by Daniel McInerney, describes a rather unique approach to the Tuning methodology developed by the American Historian Association (AHA), which led an "AHA Tuning" project, involving its members and starting in 2012. After six years of work, the author explores with the help of an exhaustive questionnaire "*the practical application and implementation of Tuning discussions, the ways in*

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which broad frameworks and desired proficiencies are realized through concrete, tangible changes in classroom teaching, assignments, assessments, and outreach. This record of on-the-ground praxis rests at the heart of the survey".[2] The article offers an introduction with an updated bibliography about History "Tuners". It gives interesting and abundant data about how U.S. historians (about 300 respondents) perceived the innovative methodology and its concrete fruits, in short "*about how Tuning operates 'on the ground'*".

The second contribution flies at a different height, from the micro-level "*on the ground*" of the previous article to the macro-level of international agreements which favour profound innovative process at national level. The article by Tengteng Zhuang and Xiaoshu Xu describes the ambitious process named "New Engineering Education (NEE)", started by China after joining the Washington Accord[3] in 2016 and in the wake of the "broader global technological revolution" (e.g. the concept of 'Industry 4.0'). The article describes in detail the three founding policy documents issued by China's Ministry of Education in 2017, namely 'Fudan Consensus', 'Tianda Action', and 'Beijing Compass'. In order to understand here the flavor of the process, the "Tianda Action" underlines the need to '*build up a student-centered concept, enhance faculty-student interaction, reform teaching methods and assessment methods in order to form a learner centered engineering education pattern*'. Moreover, according to the authors, "*NEE puts a prominence on promoting connectedness among different disciplines as an approach to educating prospective engineers at higher education institutions*". References to other ongoing and similar processes in the world are made whenever appropriate. The article also describes the concrete actions, taken to enforce NEE and now in progress, and the possible challenges and limits of such a huge upgrading process.

The following article by Kayo Matsushita, Kazuhiro Ono, and Yugo Saito deals with the assessment of learning outcomes in the context of the "*current assessment research regarding how to connect the course- and program-level assessments*". This is one of most important aspects in the present/advanced QA procedures.

The authors – on the basis of a consolidated experience for assessing performances in Problem Based Learning courses in the programme for Dental Education at the Faculty of Dentistry at Niigata University – propose

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[2] Daniel McInerney, e-mail to the Editors, 9 May 2018.

[3] The Washington Accord can be presented as "*an international agreement between bodies responsible for accrediting engineering degree programmes,*"http://www.ieagreements.org/accords/washington/.

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a "*modified*" Triple Jump assessment at the level of key courses of the whole programme. Then they insert/embed these by now "*double duty*" assessments in an innovative method to integrating course-level and program-level assessments. The proposed method is named "Pivotal Embedded Performance Assessment", PEPA for short. According to the authors, the method could be profitably used also in medical and pharmaceutical education and possibly in other fields (e.g. educational programmes for teachers and legal professions). Indeed, they hope to explore a possible PEPA's extension to other fields in their future research work.

The article by Melanie Bernadette Luckay deals with the redesign of the last year of a 4-years Bachelor in Education at University of the Western Cape (UWC) and focuses on the course "Educational Practice", which covers 25% of the whole programme (in terms of local credits) and which progressively develops along the four Bachelor years. The author uses here, as a framework for re-designing the course, the basic concepts of Biggs' Constructive Alignment. In this way, the author is able to integrate the different levels of competences, which are simultaneously required by the new (2015) national policy document *Minimum Requirements for Teacher Education Qualification* (MRTEQ), by the university itself (i.e. the so-called *graduate attributes*) and by the programme requirements (i.e. the *Intended Learning Outcomes*), with a careful eye on the corresponding appropriate assessment tools. The article highlights the many challenges of the process, particularly in order to take care of the unequal preparation of students who enter the first Bachelor year. As a whole, the article wants to be, in the words of this passionate author, "*a discussion on the journey that the Faculty staff embarked on towards changing and adapting the Bachelor of Education programme"*.

The last article in this Issue puts an important question and – we hope – gives the basic inputs for a further future debate. Francisco Del Canto Viterale wants "*to analyze the role of the university within the changing world order of the 21st Century"*. Within this broad scope, he carries out an extensive review of the existing literature in the fields of International Studies, Education Sciences, and other Social Sciences. After a synthetic description of the main "characteristics" shown by universities in the past centuries, the author offers an analysis of the new international context – which is going through a stage of *intersystem transition* – in terms of actors, relationships, new relevant topics, and processes (as many as six main processes are identified). In this varied context, the author presents the main challenges which the university is facing, some of them seemingly important for, and linked to, the future of the planet. Finally, the author outlines

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possible strategies for reconfiguration and adaptation processes of the university, in some cases already in place, which might help the university itself to understand extent and limits of its role as a "global actor". We renovate here the wish that this paper may start a fruitful debate among readers and potential future authors.

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Articles

Historical Study in the U.S.: Assessing the impact of Tuning within a professional disciplinary society

Daniel J. McInerney*

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Abstract: The U.S.-based American Historical Association (AHA), the largest – and most influential – professional organization for historians, was the first disciplinary society in the world to lead a Tuning project, launching its work in 2012. This essay analyzes a survey distributed to historians on campuses that have taken part in the AHA Tuning project. The purpose is to understand, after six years of work on the project, what practical difference Tuning has made for historians, students, courses, curricula, and departments. Survey data indicate that, under the disciplinary society's guidance and encouragement, historians have created meaningful learning outcomes, implemented the objectives in courses and curricula, and begun work in the measurement of student learning. Not surprisingly, the project has faced limits and obstacles, particularly with leadership of the work, faculty buy-in, administrative support, follow-up assistance, enrollment concerns, student engagement, and outreach to stakeholders. However, after half a dozen years of activity, U.S. historians have made marked progress not only in articulating disciplinary learning outcomes (as have colleagues in other parts of the world) but also in implementing and assessing those objectives. While precise readings of "impact" remain elusive, a

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More information about the author is available at the end of this article.

Acknowledgements: The research for this work was conducted at the Deusto International Tuning Academy (DITA) in February and March 2018 and received financial support from DITA Short-Term Visit Scholarship program. The author thanks the many educators who assisted in this project: Pablo Beneitone, Maria Yarosh, Ladislas Bizimana, and Emily J. Wood at the Tuning Academy; James Grossman, Julia Brookins, Emily Swafford, Anne Hyde, Elaine Carey, and Liz Lehfeldt of the American Historical Association; educational consultant Robert Stein; and Tammy Proctor and Norm Jones of the History Department, Utah State University.

Tuning project under the direction of a disciplinary society has helped generate significant pedagogical, curricular, and cultural changes in the field of history.

Keywords: Tuning; history; American Historical Association; AHA Tuning; disciplinary society; learning outcomes; assessment; US higher education; impact study

I. Introduction: Tuning the discipline of history around the world – and in the U.S.

The October 2017 special issue of *Arts and Humanities in Higher Education* examined "Tuning History." Editors Alan Booth and David Ludvigsson gathered articles from colleagues in Europe, Latin America, and the U.S. reflecting on the work of Tuning in the discipline of history since 2000. Overall, the contributors offered a mixed report, one that was promising but cautious. Cooperative work on the initiative has proceeded at a steady pace – but still confronts confusion over the Tuning process and resistance to the reform effort. Disciplinary specialists have come together to clarify shared learning outcomes – yet they recognize significant differences in traditional national approaches to the subject area. The movement toward student-centered learning has gained support – though often without a systematic reappraisal of pedagogy. And faculty have crafted compelling declarations on disciplinary competences – however the statements remain, in some areas, quite removed from teaching practice. The process, Booth and Ludvigsson concluded, has been "both stimulating and challenging."[1]

Whatever limits and constraints have operated in Tuning the field of history, the work continues to expand and become more refined. Colleagues have recently outlined in even greater detail guidelines for developing competencies and evaluating learning in five key subject areas, including history.[2] When considering the key figures in both past and continuing work

[1] Alan Booth and David Ludvigsson, "Tuning History," *Arts and Humanities in Higher Education* 16, no. 4 (October 2017): 332, https://doi.org/10.1177/1474022216686507.

[2] Ann Katherine Isaacs, Guðmundur Hálfdánarson, and Carla Salvaterra, eds., *TUNING Guidelines and Reference Points for the Design and Delivery of Degree Programmes in History, Edition 2018* (Groningen, Netherlands: University of Groningen, 2018), https://www.calohee.eu/wp-content/uploads/2018/11/1.3-Guidelines-and-Reference-Points-for-the-Design-and-Delivery-of-Degree-Programmes-in-History-FINAL-v2.pdf. The document is part of the recently-implemented CALOHEE project ("Measuring and Comparing Achievements of Learning Outcomes in Higher Education in Europe"), designed to clarify and contrast levels of achievement in the knowledge and skills highlighted in different disciplines. For information on this important new generation of Tuning projects, see: https://www.calohee.eu/.

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on Tuning, who has played a central role? Ann Katherine Isaacs of the University of Pisa reminds us that "historians, working together, created, led, and lead Tuning," demonstrating that the knowledge, skills, and abilities of the discipline "are useful in fields far broader than those of traditional historical teaching and research."[3]

Reporting on the experience of French historians in the *AHHE* special issue, Jean-Luc Lamboley discussed the "unfavourable context" in which Tuning unfolded. Encountering more "indifference" than active resistance, the project has operated within an academic culture characterized by content-based approaches to learning, research-focused careers of professors, independent-minded aversion to business links, and time-constrained complaints of initiative fatigue. Despite these challenges, a promising, competence-based framework for history education has emerged.[4] Marco Velázquez Albo's description of the two-phased Latin American Tuning project (2004-2007, 2011-2013) pointed to difficulties with "initial resistance" that grew out of national economic disparities, diverse methodological approaches, generational differences, limited attention to pedagogy, and deep concerns over "globalization." Yet faculty participants displayed a strong sense of cooperation over shared competences and a greater awareness of "the importance given to teaching and learning history."[5]

The special issue also included my report on Tuning history in the U.S., an overview that explained how effective engagement in the *process* has been accompanied by "confusion, hesitancy, and resistance."[6] The present article's survey of historians' Tuning *activity* will show that disciplinary colleagues have made considerable progress by moving Tuning from stages

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[3] Ann Katherine Isaacs, "Tuning and History: A Personal Overview," *Arts and Humanities in Higher Education*, 16, no. 4 (October 2017): 377, https://doi.org/10.1177/1474022216686506.

[4] Jean-Luc Lamboley, "Tuning History: The French Experience," *Arts and Humanities in Higher Education*, 16, no. 4 (October 2017): 371-384, https://doi.org/10.1177/1474022216686525.

[5] Marco Velázquez Albo, "Tuning History in Latin America," *Arts and Humanities in Higher Education*, 16, no. 4 (October 2017): 362, 367, https://doi.org/10.1177/1474022216686522. See also: Pablo Beneitone et al., eds., *Reflections on and Outlook for Higher Education in Latin America: Final Report, Tuning Latin America Project 2004-2007* (Bilbao: Publicaciones de la Universidad de Deusto, 2007), http://tuningacademy.org/wp-content/uploads/2014/02/TuningLAIII_Final-Report_EN.pdf; Pablo Beneitone and Maria Yarosh, "Tuning Impact in Latin America: Is There Implementation beyond Design?," *Tuning Journal for Higher Education* 3, no. 1 (November 2015): 187–216, doi: 10.18543/tjhe-3(1)-2015pp187-216.

[6] Daniel J. McInerney, "Tuning the Discipline of History in the United States: Harmony (and Dissonance) in Teaching and Learning," *Arts and Humanities in Higher Education* 16, no. 4 (October 2017): 337-57, https://doi.org/10.1177/1474022216686523.

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of articulation to implementation to assessment. Yet, as in France and Latin America, work in the States has proceeded in "fits and starts." Most U.S. history faculty came to the project with little formal pedagogical training and a lack of familiarity with outcomes-based approaches to learning. The core language of the project remained mysterious to many historians. Few had experience with discussions across multiple campuses – or in conversations with various "stakeholders." Some were deeply concerned about intrusions on academic freedom and the seemingly "instrumentalist" framework of Tuning. And the prospect that the initiative might renew debates over "history standards" (bringing back memories of an intense dispute in the 1990s) left numerous colleagues uneasy.

As Pablo Beneitone and Edurne Bartolomé have noted in other regions,[7] these "cultural" concerns often combine with local educational structures to shape – and at times complicate – the work of Tuning. Such is the case in the U.S. which operates in a highly decentralized environment with no single, national administrative office for post-secondary education to guide projects such as Tuning. Among other distinctive national characteristics, a third of all undergraduates in the States attend one of 1600 *two-year* campuses that provide a strikingly diverse student body with both academic and vocational programs. Much of the teaching at two- *and* four-year institutions focuses on *"General Education"* programs that introduce U.S. students (regardless of their major areas of study) to a breadth of study across multiple disciplines. Two-thirds of the instructors that students meet in classes work as contract, *"on-tenure track" faculty*, colleagues who often find themselves removed from institutional discussions of pedagogy, learning, and curricula. And in this dispersed and varied world of higher education, the funding for pedagogical and administrative initiatives commonly comes from *private foundations* rather than public sources. Philanthropic agencies have been responsive, generous, and patient with the higher education community – although

[7] Pablo Beneitone and Edurne Bartolomé, "Global Generic Competences with Local Ownership: A Comparative Study from the Perspective of Graduates in Four World Regions," *Tuning Journal for Higher Education* 1, no. 2 (May 2014): 305, 330-331, http://dx.doi.org/10.18543/tjhe-1(2)-2014pp303-334. The researchers provide a valuable examination of generic competences in Europe, Latin America, Africa, and Russia. See also: György Nováky, "The Same History for All? Tuning History," in David Ludvigsson and Alan Booth, eds., *Enriching History Teaching and Learning: Challenges, Possibilities, Practice: Proceedings of the Linköping Conference on History Teaching and Learning in Higher Education* (Linköping, Sweden: Linköping University, 2015): 101-119, http://liu.diva-portal.org/smash/get/diva2:786270/FULLTEXT01.pdf.

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their "strategic plans" and objectives differ widely (and can change rather quickly) contributing, at times, to shifting or overlapping agendas for academic reform.[8]

One such agency, the Lumina Foundation, took the lead in sponsoring research and funding for Tuning in the U.S. Informed by the late Dr. Clifford Adelman's studies on the Bologna Process and Tuning,[9] Lumina (along with the William and Flora Hewitt Foundation), initiated "Tuning USA" in December 2008.[10] Work began on the project in Spring 2009 in three *state systems* of public higher education. Lumina expanded the work to include additional states and a regional consortium of campuses in the nation's midsection.[11]

The foundation then moved in a unique direction. Recognizing Tuning as a discipline-based, faculty-led initiative suited to all types of institutions and all levels of student learning, Lumina funded a project under the leadership of a fitting organization: a nationwide, faculty-focused, professional disciplinary society, the American Historical Association. The AHA's members occupy positions on nearly all U.S. campuses; historians have maintained a strong presence in "Gen Ed" programs; and the organization has a continuing interest in questions of teaching and learning and in the

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[8] On non-tenure track faculty, see websites for The Delphi Project and the American Association of University Professors: http://www.thechangingfaculty.org/; https://www.aaup.org/report/status-non-tenure-track-faculty. On shifting reform agendas, see: George D. Kuh and Pat Hutchings, "Assessment and Initiative Fatigue: Keeping the Focus on Learning," in George D. Kuh et al., *Using Evidence of Student Learning to Improve Higher Education* (San Francisco, CA: Jossey-Bass, 2015), 183-200.

[9] Clifford Adelman, *The Bologna Club: What U.S. Higher Education Can Learn from a Decade of European Reconstruction* (Washington D.C.: Institute for Higher Education Policy, 2008), https://files.eric.ed.gov/fulltext/ED501332.pdf; *Learning Accountability from Bologna: A Higher Education Policy Primer* (Washington, D.C: Institute for Higher Education Policy, 2008), http://www.ihep.org/sites/default/files/uploads/docs/pubs/learning_accountability_from_bologna.pdf; and *The Bologna Process for U.S. Eyes: Re-Learning Higher Education in the Age of Convergence*. (Washington, DC: Institute for Higher Education Policy, 2009), https://files.eric.ed.gov/fulltext/ED504904.pdf.

[10] Lumina Foundation, "Tuning USA: Lumina Foundation Launches Faculty-Led Process That Will Involve Students and Employers in Linking College Degrees to Workplace Relevance and Students' Mastery of Agreed-Upon Learning Objectives," April 8, 2009, https://www.luminafoundation.org/news-and-views/tuning-usa-lumina-foundation-launches-faculty-led-process-that-will-involve-students-and-employers-in-linking-college-degrees-to-workplace-relevance-and-students-mastery-of-agreed-upon-learning-objectives.

[11] Robert Stein and Leah Reinert, *Transparent Pathways, Clear Outcomes: Using Disciplinary Tuning to Improve Teaching, Learning, and Student Success*, (Minneapolis, MN: Midwestern Higher Education Compact, 2014), http://www.mhec.org/sites/mhec.org/files/2014march_tuningmonograph.pdf.

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needs of non-tenure-track instructors. In February 2012, Lumina officially announced its new "AHA Tuning" project.[12]

I.1. *The American Historical Association Tuning Project*

Founded in 1884, the American Historical Association is the largest, most prominent and prestigious disciplinary organization for historians in the United States. Representing nearly 13,000 members drawn from all areas of specialization and faculty ranks, the AHA produces the field's most respected journal (the *American Historical Review*), holds an annual conference attracting 4,000-5,000 attendees, and organizes regional meetings held across the nation throughout the year. The AHA clarifies the key reference points and "best practices" for the discipline on issues tied to research, teaching, hiring, and ethical expectations while also performing the important work of public advocacy on controversial issues.[13] The society has helped shape curriculum at all educational levels, recognized excellence in teaching, guided the preparation and selection of history textbooks, and reported on pedagogical approaches, learning outcomes, digital history, liberal education, and career opportunities for graduates.[14]

The AHA's Tuning work began in two stages. Initially, a small "project leadership core" of faculty, AHA officers, and consultants gathered at a retreat to discuss shared commitments to the discipline.[15] The resulting "Discipline Core" of historical study described "the skills, knowledge, and

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[12] "Lumina Foundation," accessed February 22, 2018, https://www.luminafoundation.org/; "Hewlett Foundation," Hewlett Foundation, accessed February 22, 2018, https://www.hewlett.org/. For an overview of Tuning projects in the United States, see: Daniel J. McInerney, "Tuning and Degree Profiles: U.S. Projects in Departments, Universities, States, Regions, and Disciplinary Societies, 2009-Present," *NIER* (National Institute for Educational Policy Research [Japan]) *Research Bulletin*, no. 144 (March 31, 2015): 27–50 https://www.nier.go.jp/kankou_kiyou/144-103.pdf.

[13] "About AHA & Membership," American Historical Association, accessed February 21, 2018, https://www.historians.org/about-aha-and-membership.

[14] "Teaching Resources for Historians," American Historical Association, accessed February 21, 2018, https://www.historians.org/teaching-and-learning/teaching-resources-for-historians; Miriam E. Hauss, "White Paper Presented on the Role of the History Major in Liberal Education," *Perspectives on History* 46, no. 9 (December 2008), https://www.historians.org/publications-and-directories/perspectives-on-history/december-2008/white-paper-presented-on-the-role-of-the-history-major-in-liberal-education.

[15] Recalling contentious debates in the 1990s on "National History Standards," the group eschewed the word "standards," focusing instead on discussions of what "history is," what "historians do," and what "history majors can [do]." See: Gary B. Nash, Charlotte Antoinette

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habits of mind that students develop in history courses and degree programs." Embracing Tuning's commitment to diversity and autonomy, the Core served as "a reference point," not as a set of fixed requirements for history departments and curricula. The group distributed the document to AHA members for comment and revision.[16]

In the second stage of the project, the AHA invited historians from around the nation (and a range of institutions) to take part in Tuning workshops. The meetings introduced participants to a range of topics: reviewing Tuning basics; forming common goals; "aligning" courses and curricula with the "Discipline Core"; "scaling" learning outcomes to different course levels and degrees; assessing student learning; and clarifying the role of history in lifelong learning, careers, and active citizenship. The AHA expected participants to carry the Tuning project back to their home campuses in discussions with faculty, students, staff, administrators, and stakeholders. Dr. James Grossman, AHA executive director, explained Tuning as "part of the AHA's emphasis on facilitating communication among historians and between historians and the general public." The goal was to "generate curricular frameworks that combine common themes and practices with the flexibility appropriate for institutions with different missions and circumstances."[17]

The project began with 60 participants (out of 120 applicants) who formed the first "AHA Tuning Cohort." Their work in 2012 and 2013 proved so successful – and generated such wide interest – that the AHA organized a second "cohort" in 2014. Altogether, the two groups of Tuning participants totaled nearly 160 historians on over 120 campuses.[18]

Crabtree, and Ross E. Dunn, *History on Trial: Culture Wars and the Teaching of the Past* (New York: Vintage Books, 2000).

[16] Conversations about the AHA Discipline Core continued for years through four versions of the document (in 2012, 2013, and 2016). See: AHA Tuning Project, "AHA History Tuning Project: 2013 History Discipline Core," American Historical Association, n.d., https://www.historians.org/teaching-and-learning/tuning-the-history-discipline/2013-history-discipline-core."AHA History Tuning Project: 2016 History Discipline Core," American Historical Association, https://www.historians.org/teaching-and-learning/tuning-the-history-discipline/2016-history-discipline-core.

[17] Julia Brookins, "History Faculty Begin Nationwide Tuning Project," *AHA Today*, February 13, 2012, http://blog.historians.org/2012/02/history-faculty-begin-nationwide-tuning-project/.

[18] Ibid.; AHA Tuning Project, "American Historical Association History Tuning Project: Call for Applications," American Historical Association, 2014, historians.org/Documents/Tuning/AHA%20Tuning%20application.pdf; AHA Tuning Project, "Tuning Participants," American Historical Association, n.d., https://www.historians.org/teaching-and-learning/tuning-the-history-discipline/tuning-participants.

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Discussions of Tuning continued outside the cohorts in the AHA's annual meetings and regional conferences, essays in the society's *Perspectives on History* magazine, blog posts, discussion groups, and journal articles.[19] As the work expanded, so did engagement in issues closely tied to Tuning: the pedagogical and career training of doctoral students; the work of faculty with non-majors and history General Education courses; the common interests of college faculty and high school history teachers; and the connections between outcomes-based projects in the discipline and similar reforms across entire degrees.[20] Almost immediately, the work of Tuning opened up a wider field of activity than anyone had first anticipated, building a coherent, convergent, integrated "network" of affiliated reform initiatives in teaching and learning.

II. **The Survey**

A series of reports examining the organization and effects of Tuning in the U.S. (and in the American Historical Association) have appeared since 2009. All of the state and regional higher education systems involved in Tuning– as well as the American Historical Association –submitted periodic "grantee" reviews to the Lumina Foundation detailing the progress of their work.[21] The AHA also collected reports from members of its two Tuning

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[19] For links to AHA Tuning events, see: https://www.historians.org/teaching-and-learning/tuning-the-history-discipline/past-events. For articles on AHA Tuning, see: *The History Teacher* 49, 4 (August 2016), http://www.societyforhistoryeducation.org/A16Preview.html; "Forum: Tuning History: Redirecting History Surveys for General Education"; *World History Connected* 13, 2 (June 2016), http://worldhistoryconnected.press.uillinois.edu/13.2/index.html; and "Textbooks and Teaching," *Journal of American History* 102, 4 (March 2016): 1102-1137. For an overview, see: McInerney, "Tuning the Discipline of History in the United States."

[20] Jacqueline Jones, "The Malleable PhD Mini-Conference," *Perspectives on History* 51, no. 2 (February 2013); "Career Diversity for Historians," American Historical Association, https://www.historians.org/jobs-and-professional-development/career-diversity-for-historians; "Globalizing the US History Survey," American Historical Association, https://www.historians.org/teaching-and-learning/globalizing-the-us-history-survey; "College, Career, and Civic Life (C3) Framework for Social Studies State Standards," National Council for the Social Studies, https://www.socialstudies.org/C3; "Degree Qualifications Profile," National Institute for Learning Outcomes Assessment, http://degreeprofile.org/. On the "intersection" between Tuning and other initiatives in teaching and learning, see Sect. VI, Conclusions, below.

[21] "Reports from Tuning USA Projects," Document Archive, Degree Qualifications Profile (National Institute for Learning Outcomes Assessment), http://degreeprofile.org/document-archive/. The full set of reports (2009-2014) from the State of Utah are available:

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cohorts about the work of the project on their campuses.[22] Colleagues with the National Institute for Learning Outcomes Assessment also released a *Tuning Impact Study* that draws from interviews, reports, observations, conference presentations, and journal articles.[23]

Yet practical questions about the way Tuning operates "on the ground" remain missing. How have "rank-and-file" faculty responded to Tuning – especially, the campus instructors who were not in Tuning leadership or the intensive "cohorts," who learned about Tuning at second- or third-hand, but who are in classes day-to-day with heavy teaching responsibilities? To what extent has Tuning changed course design, teaching techniques, class assignments, curricular arrangements, assessment strategies, transfer policies, accreditation reviews, and engagement in the scholarship of teaching and learning? How have the majority of historians considered, applied, questioned, or ignored the core elements of the project? And how have history departments – the core administrative unit for the discipline in most U.S. institutions – responded to the AHA project? After six years of work, what practical difference has Tuning made in historical study? In a word, as Booth and Ludvigsson have also concluded, the work has been "both stimulating and challenging," demonstrating a considerable (though circumscribed) advance in disciplinary activity on outcomes-based, student-centered teaching and learning.

II.1. *Structure of the survey*

The online AHA Tuning survey contained 42 questions with an estimated completion time of 12-15 minutes. The intended audience was college-level history instructors of all ranks teaching at institutions that sent representatives to the AHA Tuning "cohorts." The material, formatted in Qualtrics software, went out through email to 1500 faculty members on 70 different campuses (nearly 60% of the institutions with cohort participants).

Phyllis Safman et al., "Utah Tuning Reports to the Lumina Foundation," Grantee Report, Utah Tuning: Designing Learning Outcomes for Post-Secondary Degrees, n.d., https://utahtuning.weebly.com/utah-tuning-reports.html.

[22] For reports from two- and four-year institutions, see: American Historical Association, "Resources for Tuning the History Discipline," n.d., https://www.historians.org/teaching-and-learning/teaching-resources-for-historians/resources-for-tuning-the-history-discipline. The AHA's surveys with Tuning's leadership core and cohort members remain "internal reports."

[23] David W. Marshall, Natasha A. Jankowski, and Terry Vaughan, *Tuning Impact Study: Developing Faculty Consensus to Strengthen Student Learning* (Urbana, IL: University of Illinois and Indiana University, National Institute for Learning Outcomes Assessment, 2017).

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The survey opened with a review of the AHA Tuning project and previewed the questions.

- Part I: personal and professional information about each respondent.
- Part II: activities with AHA Tuning and related projects in history departments
- Part III: curricular/course design changes/Tuning's perceived level of influence on changes
- Part IV: additional question on changes in teaching and learning.
- Part V: Tuning's perceived influence over assessment of student learning.
- Part VI: Tuning's effects on course enrollments and numbers of majors.
- Part VII: benefits and problems participants discovered with AHA Tuning.
- Part VIII: assistance that the AHA should offer respondents and their colleagues.
- "Conclusion": allowed participants to write additional comments and queries.

II.2. *Goals – and limits – of the survey*

I came to this project as a novice in survey design and analysis – and as an interested participant. Serving as an adviser to the AHA Tuning project, my intention was to develop a survey that could help the AHA understand how its members apply Tuning in their daily work – and help those outside the U.S. to consider the contributions of professional disciplinary societies to Tuning projects. In other words, I developed the project as an advocate for AHA Tuning, not as a disinterested and detached observer. The *utility* of the survey has always been at the center of the research. I hope the survey serves as a starting point for the AHA to gather more detailed and systematic information about the directions in which Tuning has guided the discipline.

The survey results fell short of expectations in three important ways:

- Percentage of responses: Nearly 300 historians responded, but the response rate was 20%. The percentage was lower than anticipated.[24]

[24] The percentage was closer to the response rate of *students* rather than teachers in one other educational study. Samúel Lefever, Michael Dal, and Ásrún Matthíasdóttir, "Online

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- "Non-tenure track" faculty: This group represents the majority of instructors on post-secondary campuses. But only 20% of responses came from this group.[25]
- Faculty at two-year institutions: Only 9% of respondents worked on these campuses.

Despite these limits, survey results did meet other expectations:

- Instructors who were *not* part of the AHA Tuning cohorts: Of those who replied, 22% were members of a cohort; but 78% had not participated in the Tuning workshops.
- Faculty with limited knowledge of Tuning: Over 46% of replies came from those who described themselves as "quite" or "fairly" knowledgeable about Tuning. Yet 53% of the responses came from those identified as Tuning beginners or unfamiliar with the work.
- Educators with teaching assignments: Nearly 80% of the responses were from those who identified as instructors. Fewer than 20% of replies came from colleagues who identified themselves in terms of an administrative office.

III. The Influence of AHA Tuning on activities in Teaching and Learning

What did the survey reveal about teaching within history departments? The survey asked participants about the types of activities they and their department colleagues have worked on over the past five years in relation to curricula, course design, pedagogy, assessment, and enrollments. In addition, the survey asked participants to consider the perceived level of influence that AHA Tuning had on reforms they had discussed or enacted.

Survey results: Initial questions asked if Tuning discussions took place in a history department, what issues came up for discussion, and who participated in the conversations.

Data Collection in Academic Research: Advantages and Limitations," *British Journal of Educational Technology* 38, no. 4 (July 1, 2007): 574–82, https://doi.org/10.1111/j.1467-8535.2006.00638.x; Don A. Dillman, Jolene D. Smyth, and Leah Melani Christian, *Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method*, 4th ed. (Hoboken, NJ: Wiley, 2014).

[25] Colleagues have suggested that non-tenure track faculty (with higher average teaching loads and no personal office) might not have the time or privacy to reply to the survey.

Has your department / academic unit held faculty discussions of AHA Tuning?

% indicating meetings took place	66%	% indicating 1 meeting	% indicating 2 meetings	% indicating 3+ meetings	% working on a 2 yr campus	% working on a 4 yr campus
		45%	35%	20%	59%	67%
% indicating meetings did NOT take place	33%	–	–	–	41%	33%

Departments/academic units that held Tuning meetings:
Issues most often discussed or implemented

	% indicating issue was discussed or implemented	% working on a 2 yr campus	% working on a 4 yr campus
clarify learning outcomes/ objectives	90%	93%	87%
examine assessment of learning	65%	64%	65%
review design/content/purposes of introductory courses	64%	79%	61%
explore majors' career options	61%	50%	61%
review design/content/purposes of capstone courses	52%	14%	55%
examine assignment design	34%	36%	31%

Departments/academic units that held Tuning meetings:
Who participated in discussions?

	% indicating participation of group	% indicating participation; working on a 2 yr campus	% indicating participation; working on 4 yr campus
full-time, tenure-track faculty	89%	92%	89%
head of department/ academic unit	78%	83%	78%

…/…

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.../...

	% indicating participation of group	% indicating participation; working on a 2 yr campus	% indicating participation; working on 4 yr campus
faculty who were in Tuning cohorts	62%	35%	63%
faculty with renewable contracts	39%	–	42%
part-time faculty	20%	8%	21%
adjunct faculty	15%	33%	14%
students	15%	8%	15%
academic advisors	12%	8%	12%
deans	11%	17%	11%
post-docs	6%	–	6%

Analysis: The responses point to three areas of success for the AHA Tuning project:

- Two-thirds of responses indicated that meetings on Tuning took place one or more times (although meetings occurred more commonly on 4-year rather than 2-year campuses).[26]
- The issues discussed in meetings matched the central points stressed by the AHA. Five major issues dominated most Tuning meetings, with fairly even participation on both 2- and 4-year campuses.[27]
- A range of faculty leaders and participants engaged in the conversations.

Three groups participated most often in discussions: tenure-track faculty; "cohort" members; and department heads. Other participants (in 15-39% of responses) included contract faculty and students. Two institutional contrasts stand out. No 2-year campus reported the presence of instructors with renewable contracts; and few 4-year campuses worked with adjunct faculty.

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[26] Sarah Shurts, "History in Harmony: The AHA 'Tuning' Project in the Community College and the Closing of the Transfer Gap," *The History Teacher* 49, no. 4 (August 2016): 503–17, http://www.societyforhistoryeducation.org/pdfs/A16_Shurts.pdf.

[27] The exceptions? Historians on 2-year campuses – whose work focuses on General Education, introductory courses and less on "upper-division" classes – understandably discussed history surveys more often and "capstones" less frequently.

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While recognizing some Tuning successes, three issues deserve comment:

First, two-thirds of respondents said that Tuning discussions *had* occurred; but a full third stated that "we have *not* had discussions on Tuning." Recall that surveys went out only to institutions with cohort representatives, the colleagues asked by the AHA to carry the conversation back to their campuses. Yet, on 4-year institutions, 33% of replies reported that there were no meetings; on 2-year campuses, 41% of responses indicated an absence of meetings.

In subsequent parts of the survey, however, there were multiple questions, focused on a range of issues, that allowed respondents to address the presence or absence of Tuning discussions. While 33% of respondents in the broad, opening question stated that their department had no discussion of AHA Tuning, twelve additional questions with the same (or similar) option revealed a *range* of responses, with 22-36% indicating the absence of Tuning meetings. One might think respondents knew that Tuning discussions either had or had not occurred. Some of the difference may rest with slight shifts in wording that were, regrettably, part of the survey questions. In addition, it is possible that the precise language of "Tuning" did not dominate meetings on some campuses – even though colleagues may have still engaged in discussions and practices directly tied to the issues that Tuning addresses.[28] Perhaps some respondents, growing weary of stating that Tuning had not occurred, turned to other types of responses to make their point. Whatever the possible explanations, approximately one-third of replies indicated that "Tuning," in some capacity, to some degree, at some level, had *not* come up for discussion.

A second concern involves the *range* of educators who took part in Tuning discussions. Project leaders hoped to engage a large and varied group of educators and stakeholders in conversations. However, fewer than 15% of responses indicated that department Tuning meetings included post-docs, deans, academic advisors, librarians, career counselors, K-12 teachers, employers, community leaders, or policy makers.

A third concern involves limits on the *types* of issues addressed in the majority of departments. Most reported that conversations focused on learning outcomes, assessment, the design of introductory and capstone courses, and graduates' career prospects, all of which are significant and valuable discussions. But a number of additional Tuning activities received less attention. Fewer than 1 in 7 responses indicated that their departments met with "stakeholders" (such as employers and policy makers), arranged

[28] McInerney, "Tuning the Discipline of History," 350.

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meetings of faculty from two-year *and* four-year institutions, improved the process of transferring student course credits, or focused greater attention on non-majors.[29]

These three concerns do not indicate "failures" of AHA Tuning. Project leaders within the AHA recognize that the activity, in the words of Dr. David Pace, "requires new thinking and a willingness to break with the past," work that requires considerable time, effort, and patience.[30] History faculty are off to a strong start in Tuning work. These concerns simply point to work that history colleagues and the AHA still need to address on U.S. campuses.

III.1. *Effects of the AHA Tuning Project on curricula*

The survey asked if faculty engaged in any of eight Tuning efforts that addressed programs of study. Participants could add "other" projects that did not appear on the list. For each activity, respondents also reflected (from a large number of options) on the level to which AHA Tuning may have influenced curricular work: if Tuning had major, some, minimal, or no influence; if Tuning integrated well with other reform projects to prompt changes; or if the department had not instituted the particular change. Survey results led to interesting sets of reflections.

Survey results: The four most commonly noted curricular changes were also those for which participants believed Tuning had the greatest influence.

Analysis: A clear majority of history faculty have engaged in a wide range of projects reshaping their programs' curricula. In the five most frequently-noted initiatives, 41%-62% of respondents felt that Tuning some or a major influence over the change.

The results in the far-right column are puzzling, however, and raise a complicated question concerning Tuning's "influence," "impact," or "effect." We will return to the topic in Section VI, "Conclusions." At this point, it is

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[29] The question listed 14 choices of discussion topics emphasized by the AHA. Among other choices that received little attention: reviewing the design, content, and purposes of graduate-level courses; meeting with K-12 teachers; and examining "dual enrollment," "concurrent enrollment," and "Advanced Placement" programs. In another institutional contrast, nearly *half* the responses from two-year campuses reported meetings of faculty on 2- and four-year campuses. Only 7% of responses from four-year institutions noted such cross-campus meetings.

[30] David Pace, "The History Classroom in an Era of Crisis: A Change of Course Is Needed," *Perspectives on History* 55, no. 5 (May 2017), https://www.historians.org/publications-and-directories/perspectives-on-history/may-2017/the-history-classroom-in-an-era-of-crisis-a-change-of-course-is-needed.

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Percentage of responses noting curricular changes
+ Tuning's perceived influence on these changes

Type of curricular change	% stating change had occurred	% stating Tuning a major influence	% Tuning – some influence	% Tuning – minimal influence	% Tuning + other projects' influence	% Tuning – no influence
identifying learning outcomes/ objectives/goals	89%	27%	29%	13%	6%	36%
developing a curriculum that emphasizes skills in historical research	84%	15%	30%	13%	7%	36%
emphasizing skills/ competencies suggested by AHA "Discipline Core"	78%	29%	33%	13%	7%	28%
mapping the curriculum	70%	18%	23%	23%	6%	30%
designing pathways through history curriculum	68%	14%	31%	17%	10%	28%
curriculum emphasizing retention, completion, equity concerns	67%	7%	22%	23%	9%	39%
curriculum emphasizing ethics, civic responsibilities, public service	57%	7%	30%	20%	5%	38%
developing a pre-major	34%	8%	11%	21%	8%	52%

important to acknowledge that the terms themselves are vague and elastic. The survey did not generate a precise, quantifiable measurement of "influence" but, instead, focused on colleagues' general *perceptions* of the way Tuning affected departmental discussions. Was there a level of awareness that the AHA's program shaped, at some level, the issues and proposals that

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came up for faculty discussion? Did faculty see an identifiable "Tuning approach" to questions of teaching and learning? Or was "Tuning" an imprecise and amorphous term that remained unclear – or seemingly unrelated to department discussions?

As survey results indicate, the perceived level of Tuning's "influence" varied from one curricular change to another. In responses to the most commonly mentioned curricular change – "identifying learning outcomes / objectives / goals" – an issue that was *central* to the AHA Tuning initiative, a full 56% felt that Tuning had some or a major role in shaping the project. However, on the same issue, 36% believed Tuning had *nothing* to do with the change. Perhaps Tuning's skills-centered approach to learning was not sufficiently clarified on different campuses. Perhaps colleagues discussed Tuning in association with a lengthy (and confusing) list of other reform activities and acronyms. Or perhaps the core themes of Tuning have become so well-incorporated into other skills-based projects that the AHA initiative is now less "visible" and distinct. As one respondent noted in comments, "we do all of these [teaching and learning activities] regularly but not in the context of AHA's Tuning project." Another added, "we do these as part of normal department work; did not know they were part of tuning."

Was there a particular body of faculty who most often noted the *absence* of any Tuning influence on curricular changes? One group was more skeptical of Tuning's impact on departmental initiatives: associate and full professors, with 20+ years of experience, working at 4-year institutions, who were not part of a Tuning cohort, and who describe themselves as "beginners" in the project. In opening questions – and subsequent queries – these colleagues expressed more doubt than others about the influence and contributions of AHA Tuning.

Still, while recognizing the reservations and suspicions held by some, one point is clear: historians have engaged in a broad range of curricular reforms and felt that Tuning played a considerable role in promoting many of these activities.

III.2. *Effects of the AHA Tuning Project on courses*

The next section asked about alterations that faculty and their department made in courses and course design since the start of AHA Tuning. Participants could mark any of six major types of course changes tied to Tuning. The survey also allowed respondents to add "other" changes

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and offer an indication of the level of influence Tuning had on any course innovations.

Survey results: Participants focused their replies on the six course design changes listed.

Percentage of responses noting course changes
+ Tuning's perceived influence on these changes

Type of course change	% stating a change occurred	% stating Tuning a major influence	% Tuning - some influence	% Tuning - minimal influence	% Tuning + other projects' influence	% Tuning – no influence
altering the structure and content of course syllabi	78%	9%	28%	18%	9%	36%
altering structure/ exercises in introductory courses	73%	11%	23%	15%	6%	45%
changing ways faculty evaluate student exercises	73%	8%	29%	20%	9%	34%
altering structure/ exercises in capstone class	69%	9%	23%	20%	8%	40%
focusing greater attention on non-majors	62%	6%	10%	24%	12%	48%
work on assignment design	43%	11%	16%	11%	7%	49%

Analysis: As with work on curricula, the survey displayed a varied range of work by historians as they reexamined disciplinary courses. Results indicate that 62%-78% of respondents engaged in five of the six course reform projects listed in the survey. Although participants had the opportunity to write in "other" types of course reforms, few provided examples beyond the half-dozen listed in the question.

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Comparing the responses of faculty from 2- and 4-year campuses on questions of course design, the survey revealed that a higher percentage of colleagues at community colleges engaged in course changes than instructors at 4-year institutions.

Percentage of responses from 2- and 4-year campuses noting course changes

Type of course change	% of 2-yr faculty stating change had occurred	% of 4-yr faculty stating change had occurred
altering the structure and content of course syllabi	86%	79%
altering structure/exercises in introductory courses	86%	73%
changing ways faculty evaluate student exercises	93%	71%
focusing greater attention on non-majors	69%	62%
work on assignment design	47%	40%

The only activity in which 2-year schools participated at a low percentage was, understandably, in the revision of capstone courses (the type of upper-division, research-intensive classes most commonly taught in the last year of a 4-year program).

A large majority of the history faculty who took part in the survey belong to departments that have taken part in a diverse set of initiatives focused on courses and course design. Although the perceived influence of AHA Tuning on these reforms was modest, the level of disciplinary engagement in reframing classes was quite high.

III.3. *Effects of the AHA Tuning Project on teaching*

The fourth part of the survey asked participants to consider how AHA Tuning may have helped revise teaching practices that they *or* their department made. The question listed nine commonly-referenced changes that cohort members and AHA leaders have discussed and implemented in the past five years. As in other parts of the questionnaire, respondents could also indicate the perceived "level" of Tuning's influence on classroom reforms.

Survey results: Responses indicate that historians have reexamined many pedagogical techniques over the past five years, though (as with course redesign) Tuning's perceived impact on these changes appears modest.

Percentage of responses noting changes in teaching
+ Tuning's perceived influence on these changes

Type of teaching change	% stating change had occurred	% stating Tuning a major influence	% Tuning – some influence	% Tuning – minimal influence	% Tuning + other projects' influence	% Tuning – no influence
deemphasizing content, focusing on historical skills	76%	13%	28%	17%	8%	32%
focus on "active learning"	78%	5%	24%	17%	10%	30%
moving away from traditional lectures	72%	5%	21%	18%	12%	43%
course work with librarians	72%	5%	15%	20%	11%	49%
focusing student work primarily on research	69%	5%	19%	21%	10%	45%
emphasizing group or collaborative assignments	59%	4%	16%	23%	9%	48%
teaching with community members	47%	2%	13%	30%	7%	48%
team teaching	33%	5%	5%	19%	9%	62%
peer teaching	30%	4%	7%	17%	2%	70%

Analysis: The majority of respondents have taken part in six different pedagogical reforms, pointing to a considerable reexamination of classroom techniques among faculty and history departments. But among those noting the changes, a minority (20-40%) felt that Tuning exercised "major" or "some" influence over the new approaches, suggesting that the impact of Tuning itself on these initiatives remained at a fairly low level.

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Three other observations about teaching practices deserve mention. First, survey responses from 2- and 4-year campuses broke down in very similar ways on this question. Second, as with courses and course design, participants noted few additional forms of innovations. Third, the phrasing of the survey may have contributed to an apparent disjunction in responses. While nearly 60%-80% of responses indicated that faculty had engaged in six different pedagogical experiments, 20%-40% of participants noted that those same changes had *not* occurred. One possible reason for this discrepancy? One response available to participants stated "I / my department has not instituted this change." I deliberately included this slight rephrasing of questions in order to see if results displayed any variation. My hope was to gain some sense of the way *individuals* responded to new teaching approaches. Those most likely to argue that teaching changes had not taken place were, once again, senior, tenured faculty on 4-year campuses who did not take part in Tuning cohorts. It remains unclear if these colleagues referred to themselves or to other faculty in their departments in their replies.

One final – and broader – point concerning Parts 1-3 of Section III sums up findings about the "impact" of Tuning. Stated simply, participants' responses suggest that the influence of AHA Tuning has been most pronounced in the design of history curricula. But faculty see the project's impact as less evident in the work of course revisions and teaching.

III.4. *Effects of the AHA Tuning Project on assessment*

The fifth section of the survey focused on assessments of student learning. While not emphasized at the start of AHA Tuning, the question of how educators recognize, capture, and report student learning has taken on an increasingly important role in the society's project, culminating in a collection of journal articles on the subject in early 2016.[31] The survey asked about faculty engagement with different types of assessment exercises promoted by the AHA and other U.S.-based educational organizations. Respondents could also reflect on the level of influence AHA Tuning held over the work.

Survey results: Of the fifteen assessment techniques listed, the majority of respondents noted work on half a dozen. While results indicted a significant level of engagement with several types of assessment, participants felt that

[31] Five articles on history assessment appear in "Textbooks and Teaching," *Journal of American History* 102, no. 4 (March 2016): 1102-1137, http://jah.oah.org/issues/march-2016/.

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AHA Tuning had – at best – only a moderate level of influence on the work of measuring student learning.

Percentage of responses noting changes in assessment
+ Tuning's perceived influence on these changes

Type of assessment	% stating change had occurred	% stating Tuning a major influence	% Tuning - some influence	% Tuning - minimal influence	% Tuning + other projects' influence	% Tuning – no influence
rubrics to evaluate student work	80%	10%	27%	18%	8%	37%
major project in capstone course	71%	8%	15%	22%	3%	51%
use assessment tools in course management sys.	61%	4%	11%	13%	9%	64%
peer evaluations	58%	3%	11%	19%	5%	62%
revised course evaluations	52%	6%	12%	14%	10%	58%
alumni surveys	52%	12%	19%	15%	7%	48%
student self-assessment	49%	4%	19%	21%	10%	47%
pre- and post-tests	47%	4%	15%	17%	11%	53%
entry/exit interviews with students	45%	9%	18%	13%	7%	53%

Historians have widely adopted rubrics in the evaluation of student exercises. Eighty percent of participants noted their use. Of those, well over a third believed that AHA Tuning had some or a major influence on the adoption of rubrics. The second most common assessment technique (in 71% of responses) involved evaluation of a "major research project within a capstone course." While the practice is widespread in departments, only 23% of surveys suggested that Tuning had some – or a major – influence on this form of assessment. In fact, the majority of responses stated that Tuning had no influence. Understandably, colleagues at 2-year campuses,

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working with students just starting historical studies, rarely reported the practice.

Among other popular approaches, three-fifths of surveys indicated that historians used the assessment tools available in course management software programs, and a slim majority reported on revised course evaluations and surveys of alumni. But fewer than 20% of respondents perceived some or a major influence from the Tuning project.

Among the remaining assessment approaches offered in the survey, 23-49% of responses indicated work departments had done with various techniques: student self-assessments, pre- and post-tests, entry and exit interviews with students, electronic portfolios of student work, student journals, employer surveys, and the use of inter-rater reliability techniques. The least common assessment practice reported on the survey – at 21% – involved the use of standardized exams

Analysis: While survey respondents generally categorized Tuning's "influence" on assessment practice as limited, three points are worth noting. First, leaders of AHA Tuning began to place more emphasis on measurements of student learning *after* the first years of the project. Second, respondents pointed to an impressive variety of tools and techniques used within the discipline. And third – perhaps most importantly –the meaningful engagement of history departments in assessment work has taken root after a long period of avoidance and aversion. A former Vice-President of the AHA's Teaching Division, Dr. Elizabeth Lehfeldt, noted (only half-jokingly) her colleagues' deep-seated reluctance to tackle assessment. In April 2013 she wrote, "Walk into a meeting of your average college or university history department and utter the simple word 'assessment.' The reactions will probably range from eye-rolling to resigned sighs to blank stares. Some might even run screaming from the room."[32]

Survey results suggest that a significant – and rapid – turnaround in historians' practices has occurred since the start of AHA Tuning. What accounts for the shift? The work may be a response to institutionally-based assessment projects; 3-11% of responses indicated that Tuning integrated with other campus initiatives. The work also seems tied to purposeful, "pro-active" measures (to ensure that disciplinary experts maintain control over disciplinary assessment). In addition, colleagues are genuinely concerned about student success. And, in part, the work also appears to have come from the

[32] Elizabeth A. Lehfeldt, "Tuning and Recharging: Tales from Twelve Months In," *Perspectives on History* 51, no. 4 (April 2013), https://www.historians.org/publications-and-directories/perspectives-on-history/april-2013/tuning-and-recharging.

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encouragement of the AHA and its recommended "best practices" for the discipline – including a recognition that thoughtful assessment allows historians both to comply with institutional reporting and improve educational practice.[33]

III.5. *Effects of the AHA Tuning Project on enrollments*

While survey participants felt that AHA Tuning has had a modest-to-significant effect on teaching and learning within the discipline, the project has remained fairly ineffective in reversing or halting declining enrollments in history courses and numbers of history majors.

Survey results:

Percentages reporting on course enrollments, majors, and perceived effect of Tuning

	increase in #	decrease in #	steady #	unsure of #	Tuning helped increase #	Tuning helped keep steady #	Tuning contributed to decrease #	Tuning: no effect on #
Enrollments in history courses	21%	50%	22%	6%	8%	9%	–	82%
Numbers of history majors	19%	58%	17%	6%	13%	8%	2%	77%

Analysis: Only one in five respondents reported that enrollments in history classes had increased in the past five years. Replies from both two- and four-year campuses were the same. Fewer than one in ten respondents believed that AHA Tuning had helped enrollments rise. None of those expressing that

[33] James Grossman and Julia Brookins, "Assessment is What We Make of It," *Journal of American History* 102, no. 4 (March 2016), 1132-1137, https://doi.org/10.1093/jahist/jav824; James Grossman, "History, Historians, and 'the Current Moment'," *Perspectives on History* 55, no. 8 (November 2017), https://www.historians.org/publications-and-directories/perspectives-on-history/november-2017/history-historians-and-the-current-moment.

Whatever progress U.S. historians have made in their work on assessment, they have much to learn from the ambitious new E.U. project CALOHEE (Measuring and Comparing Achievements of Learning Outcomes in Higher Education in Europe), https://www.calohee.eu/), coordinated by Robert Wagenaar. See: Isaacs, "Tuning and History," 406-407.

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optimistic view, however, were faculty at two-year institutions. Reports of enrollment declines came from half of respondents; a perception that enrollments remained steady came from one-fifth. On this pair of observations, there was little appreciable difference between faculty at two- and four-year schools. Had Tuning "contributed to a decline in enrollments in history classes"? *No* participants believed that to be the case. The most common reply, across the board (at 82%) was that "Tuning had no appreciable effect on enrollments."

Participants offered similar views on a second question tied to numbers of history majors. While one in five reported increases in numbers of history majors over the past five years, 17% believed that figures remained stable, while nearly three-fifths claimed that numbers of majors had declined. Considering the effect of Tuning on these figures, only 1 in 8 surveys stated that the project helped increase the number of majors; fewer than 1 in 10 felt that Tuning helped keep the numbers steady; and nearly four-fifths thought that Tuning had no appreciable effect on the number of majors. Responses from two- and four-year campuses were, again, quite similar on the issue of Tuning's influence.

However, in replies about the numbers of history majors, 60% of reports about declines came from four-year campuses. Only 15% of respondents from two-year colleges made the same claim. It is important to remember that the number of survey results from 2-year faculty was quite small; and some of the colleges do not specifically offer a "history" major. Still, the figures show a significant difference between the two types of post-secondary institutions.

One other interesting part of the responses dealing with enrollments and majors came in the additional comments written by many participants. When explaining the reasons why Tuning helped numbers grow or remain steady, colleagues offered several suggestions. Respondents noted that Tuning: provided "clarity for the students in terms of the curriculum, expectations, and outcomes"; "created an esprit de corps among our majors"; and helped faculty "revise [their] approach to survey classes," "promote the major," "increase the diversity of offerings," and "communicate the many benefits of studying history." The comments offered a concise overview of key AHA objectives, providing a small indicator of the way Tuning has even affected casual "conversations" about the history discipline.

IV. **Benefits Historians identified in the AHA Tuning Project**

In addition to questions about AHA Tuning activities, the survey asked participants to reflect on "particular benefits you have observed in the AHA

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Tuning process." The question listed 12 answers that colleagues have frequently expressed to the AHA since 2012 – and allowed participants to "measure" the level of benefit they perceived ("major," "modest," "small," "fairly inconsequential," or "does not seem to be a part of the Tuning project"). The survey also offered participants open-ended space to add "other" benefits – and the option of indicating there were "no significant benefits observed."

Survey results: This section of the survey revealed noticeably skewed results. On one hand, participants indicated that several of the available choices represented important benefits of AHA Tuning. Yet a considerable percentage of other respondents came to a strikingly different conclusion, stating that the very same points "[do] not seem to be a part of the Tuning project."

Percentage of responses noting benefits from the AHA Tuning project

Benefit	major benefit	modest benefit	small benefit	fairly incon-sequential benefit	not part of Tuning project
encourages discussions with other faculty	36%	22%	11%	7%	23%
makes implicit assumptions about the discipline explicit for students	39%	19%	13%	8%	21%
helps guide redesign of courses/ curriculum	29%	27%	14%	9%	21%
clarifies core reference points in historical study	29%	26%	14%	6%	25%
helps students construct more persuasive narrative of their knowledge and skills	24%	29%	10%	11%	26%
helps respond to "accountability" questions	23%	28%	7%	7%	26%
clarifies history's distinctive contributions to General Education	19%	28%	19%	11%	23%
helps respond to accreditation reports	24%	23%	17%	10%	26%
connects with the AHA's work, goals, advocacy	21%	25%	19%	9%	25%

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.../...

Benefit	major benefit	modest benefit	small benefit	fairly incon-sequential benefit	not part of Tuning project
encourages experimentation in teaching/content	19%	24%	17%	15%	25%
expands familiarity with "Scholarship of Teaching and Learning"	19%	20%	17%	13%	30%
encourages meetings with 2- and 4-year faculty	9%	11%	12%	15%	53%

The top four choices identified most frequently as "major" or "modest" benefits of Tuning display a contrasting pattern of responses (with fairly high negative rankings). In all four cases, 55-58% of responses were quite favorable, while one-fifth to one-quarter of respondents believed the goals were not part of Tuning's objectives. A cross-tabulation of the responses in all four choices showed that slightly more favorable responses came from a distinctive group: younger faculty, working on all types of campuses, who were not members of the AHA Tuning cohorts, and who described themselves as "quite" or "fairly" knowledgeable about Tuning. Slightly less favorable responses came from another distinctive group, noted earlier: senior faculty (20+ years of experience), working at public four-year institutions, not connected with the AHA Tuning cohorts, who had little to no familiarity with Tuning. (The remaining responses ranked the choice as a "small" or "fairly inconsequential" benefit.) Two other choices (dealing with student skills and accountability) also received a favorable response from the majority of respondents. There, too, more than a quarter of respondents categorized the issues as outside the realm of Tuning.

Participants also had the opportunity to declare that there were "no significant benefits observed" in Tuning. These replies captured some of the least enthusiastic responses to the project. Only 15% of participants replied in this way. While their responses were not "representative," the presence indicates, again, that a small group of colleagues harbor considerable skepticism or suspicion about the Tuning project.

Finally, 5% of participants noted "other" benefits from Tuning (in addition to the available choices). Half suggested that the project had either stalled or had just begun in their departments." Others felt that Tuning had

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not adequately addressed "under employment" among historians – or under enrollment among students.

Analysis: The question on Tuning benefits demonstrates that the AHA's project has succeeded in clarifying the advantages of conversations, collaboration, curricular reform, critical self-reflection, and careful attention to student needs and opportunities. These are the very changes that the leadership of the American Historical Association has tried to encourage in historical study. In 2013, the vice president of the AHA's Teaching Division, Dr. Elaine Carey, found that "Tuning has helped us coordinate our goals to build skills and knowledge important to history and transferable to other disciplines." Dr. Kenneth Pomeranz, then president of the AHA, praised "Tuning's intensive structured dialogue . . . from historian colleagues, from other disciplines, and from both friendly and hostile members of the general public." Encouraging "close collaborations with our colleagues," AHA President, Dr. Vicki L. Ruiz, applauded Tuning in 2015 as a project that "forges strategic partnerships within and across departments," cultivating "philosophical conversations and teaching resources, as well as markers of student competencies."[34] The key objectives laid out by the AHA for the Tuning project correspond to the "benefits" that history faculty have endorsed.

One other point becomes clear when examining both "benefits" and the earlier question on "activities." The qualities of Tuning most highly *admired* by historians are also the aspects of the project most commonly *implemented* by faculty and departments. In other words, survey results point not only to Tuning's aspirational goals, but also to real achievements on the ground

Yet there remains a striking division of opinion between those who perceived "benefits" with regard to the key aspects of Tuning and those who did not even consider the themes part of the initiative. Part of the explanation may involve gaps in the way colleagues have come to understand Tuning. Perhaps the *distinguishing* qualities of Tuning may remain unclear to some. Perhaps the question itself was open to different interpretations: some might

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[34] Elaine Carey et al., "Tuning the Core: History, Assessment, and the St. John's University Core Curriculum | AHA," *Perspectives on History* 51, no. 4 (April 2013), https://www.historians.org/publications-and-directories/perspectives-on-history/april-2013/tuning-and-recharging/tuning-the-core; Kenneth Pomeranz, "Why History? A Note on the AHA Tuning Project," *AHA Today* (blog), April 30, 2013, http://blog.historians.org/2013/04/why-history-a-note-on-the-aha-tuning-project/; Vicki L. Ruiz, "A Quest for Balance," *Perspectives on History* 53, no. 1 (January 2015), https://www.historians.org/publications-and-directories/perspectives-on-history/january-2015/a-quest-for-balance.

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have felt that faculty discussions, explicit outcomes, curricular redesign, and clear reference points "[do] not seem to be a part of the Tuning project" at *their* institution. Still, even if these possibilities are valid, the survey points to a layer of skepticism, suspicion, or misunderstanding about Tuning among some history faculty.

The result for one other type of "benefit" also deserves scrutiny from Tuning advocates. The AHA regards the work of two-year institutions as critical in any discussion of reform in U.S. higher education. The organization worked continuously to see that "community colleges" had a key role in the project, serving in the original "leadership core," participating in the two "cohorts" of history Tuners, and guiding regional conferences sponsored by the disciplinary organization. The survey asked about work that "encourages meetings between 2- and 4-year faculty." Over *half* of responses stated that 2-year/4-year collaboration "does not seem to be a part of the Tuning project." If we add in those who believed that the collaboration was "fairly inconsequential," and the percentage rises to nearly 70%. None of the other eleven possible responses to the "benefits" question received a similar type of skeptical response.

Which historians felt that collaboration efforts were slight? Recognizing that there were a low number of responses from community colleges, over a third of faculty at 2-year campuses believed cross-campus work was simply not part of the Tuning project. Perhaps more surprisingly, nearly 56% of faculty at 4-year institutions responded the same way. If we add in those identifying the work as "fairly inconsequential," and the percentages rise to 45% and 72% respectively. Those who worked in the AHA's two "cohorts" replied in a similar fashion: 63% of cohort members felt collaborative meetings were "inconsequential," and 71% of those outside the cohorts agreed. Whatever the level of knowledge about Tuning that respondents claimed, the majority in all categories felt that 2-year / 4-year collaboration was inconsequential or not a part of Tuning. While the AHA did much *nationally* to bring different types of campuses together, little seems to have come of the effort *locally*. AHA Tuning leaders need to place greater emphasis on the work between institutions offering associate and bachelor degrees.

V. **Problems Historians identified in the AHA Tuning project**

One key purpose of the survey was to help the AHA identify problems that historians have encountered with Tuning. Four questions addressed this

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issue in different ways, asking participants about difficulties they experienced, listing a range of pre-defined criticisms they could check, and providing open-ended responses they could add.

Survey results: The main inquiry asked, "Are there problems you have observed in the AHA Tuning process?" The question offered participants nine commonly-expressed sources of difficulty, allowing respondents to check all that applied – at different levels of concern – while also offering the option of replying "no" or writing in "other" problems.

Percentage of responses noting problems with AHA Tuning project

Problem	major problem	modest problem	minor problem	not a problem
overemphasis on students' job/career prospects	9%	19%	24%	48%
too little attention to course content	10%	15%	27%	48%
danger of "standardizing" courses and content	11%	13%	22%	54%
vocabulary used in the project	8%	14%	22%	56%
corporate/foundation influence on discipline	11%	16%	14%	59%
challenges to academic freedom	8%	7%	18%	66%
time frame for Tuning work too short	8%	8%	14%	70%
process not faculty-led	7%	9%	13%	71%
focuses on inappropriate issues in higher ed	5%	5%	13%	77%

Analysis: Of the many choices offered, respondents identified only two issues as significant:

- 52% felt that Tuning's "overemphasis on job and career prospects of students" was a major, modest, or minor problem;
- 52% saw Tuning's neglect of "course content" as a major, modest, or minor problem.

The replies are worth noting because of the way AHA leaders have presented the subjects of employment and course material in documents and workshops.

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Tuning discussions in the AHA have consistently examined the students' "next steps," particularly the professional and career opportunities that historical study might open for them. No Tuning materials make this subject pre-eminent. But it appears that a significant number of historians remain concerned that Tuning overemphasizes career questions. Similarly, Tuning's advocates – along with historians connected with the "Scholarship of Teaching and Learning" (SOTL)[35] – have addressed the importance of developing key skill sets and modes of inquiry in history courses rather than giving exclusive or primary attention to names, dates, places, and events. The reform projects have emphasized *analyzing* – rather than merely covering – content.[36] Yet, to judge from the survey, a considerable number of historians remain uneasy about pedagogical approaches that steer attention away from traditional subject matter.

These two "problems" are interesting for another reason. The concerns raised about careers and content cut across different variables. Respondents who were part of the AHA's two cohorts – and those who were not in the workshop groups – responded in similar ways to the pair of issues. The same holds true for respondents working at either two-year or four-year institutions. In other words, the concerns of historians about the handling of careers and content were similar regardless of their familiarity with Tuning – and regardless of their home institution.

On four other topics, participants expressed concern, although in none of the cases did a majority of respondents point to serious problems with the Tuning initiative.

One issue, tied to the way Tuning was originally presented, held particular interest. The first group of U.S. Tuners in 2009 experienced a measure of difficulty with the terminology of Tuning. The words that E.U. colleagues used to describe the components and operation of the Bologna Project and Tuning – including terms such as "learning outcomes," "rubrics," "competences," "cycles," and "qualification frameworks" – were new to some participants whose disciplines had long been removed from discussions of teaching, learning, and assessment.[37] I anticipated that colleagues eight years later would have the same level of difficulty "decoding" the language of Tuning. But the

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[35] The key disciplinary group in this field is the International Society for the Scholarship of Teaching and Learning (ISSOTL). See: http://www.issotl.com/issotl15/. For the *Journal of the Scholarship of Teaching and Learning*, see: https://josotl.indiana.edu/index.

[36] Lendol Calder, "Uncoverage: Toward a Signature Pedagogy for the History Survey," *The Journal of American History* 92, no. 4 (2006): 1358–70, https://doi.org/10.2307/4485896.

[37] Daniel J. McInerney, "Eight Years On: Early – and Continuing – Lessons from the Tuning Project," *NILOA Guest Viewpoints*, March 18, 2017, https://blogs.illinois.edu/view/915/489501.

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survey suggested something quite different. When asked if the "vocabulary used in the project" posed a problem, 44% agreed (with most classifying the problem as modest or minor). However, 56% did not view the language of Tuning as an obstacle or difficulty, suggesting yet another important shift in the vocabulary and expectations that guide historians.

Similarly, the majority of participants did not detect problems with "standardization," excessive "corporate / foundation influence," or "challenges to academic freedom."

Three topics remained strikingly *un*-problematic for participants. On the "appropriateness" of Tuning, most believed that the initiative examines questions that are pressing and important to post-secondary institutions. On the "faculty-led" nature of Tuning, most see the project as one shaped and controlled by disciplinary experts. Regarding the time allotted for Tuning work, 70% believed this was not a problem, suggesting that the project did not seem rushed or constricted.

The question that addressed "problems" with Tuning also left room for open-ended responses. Fewer than 10 participants contributed suggestions, but the points they raised are worth noting. More than one colleague mentioned a lack of administrative "buy-in" and the absence of "incentives" to encourage faculty participation in the Tuning project. Others expressed concern that Tuning at their institution was too rigid (allowing too little flexibility in introductory courses) or too inattentive to assessment issues. Another respondent worried that the informing "culture" of the department was too settled and unchanging to make Tuning work. A particularly interesting observation came from a participant who wondered if Tuning had "done enough to figure out what students want/think about the goals of their degree," suggesting that the "faculty-centered" nature of the project needed to become more "student-centered."

Overall, the difficulties respondents noted with Tuning tended to fall into the "minor" range. There are still significant points of dissatisfaction with the project, particularly in areas of student opportunities and course content, that remain sources of concern for many in the survey. While the AHA has repeatedly addressed these two considerations, it appears that a fair number of colleagues have not yet been convinced by the disciplinary society's arguments.

V.1. *Respondents' suggestions to the AHA*

An additional survey question provided an *in*direct measurement of "problems" encountered by history faculty: "Do you have any suggestions or

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requests to make to the American Historical Association for further assistance that the organization can offer?" The question presented ten concerns that AHA Tuning leaders have frequently heard from project participants.

Survey results: Only half of survey participants responded to this question. Those who replied could make multiple selections. The results below break down responses by type of campus and by cohort experience with Tuning.

Do you have any suggestions or requests to make to the AHA for further assistance?

Request	% of those responding making request	% of 2-yr responders requesting	% of 4-yr responders requesting	% of cohort members requesting	% of non-cohort members requesting
Tuning best practices/ case studies	53%	54%	46%	38%	62%
using Tuning to increase enrollments	49%	40%	50%	56%	46%
recognizing Tuning in tenure and promotion procedures	43%	40%	44%	51%	40%
introductory workshops on Tuning at AHA meetings	39%	31%	40%	58%	29%
engaging "naysayers" in Tuning/other reforms	29%	8%	32%	36%	26%
certificates/badges/ recognition to those working on Tuning	27%	46%	25%	38%	22%
building discussions with 2- & 4-year faculty	26%	54%	23%	33%	22%
move away from outcomes-based initiatives like Tuning	19%	23%	19%	11%	47%
focus attention on other critical issues	18%	46%	14%	18%	17%
revise AHA "Disciplinary Core"	3%	–	3%	–	4%

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Analysis: Bear in mind that half of the survey participants did not respond to the question. With the limited number of responders, there was still only one request that came from a majority of participants. It appears that a sizable number of historians want to know more about the actual experiences of colleagues trying to integrate Tuning measures into courses, curricula, department life, and discussions with stakeholders.

The second most frequent request, involving Tuning and enrollments, addresses a national concern about declining numbers of students declaring a history major and enrolling in history courses. All hope that Tuning's attention to student-centered needs and innovative pedagogical practices might help clarify strategies for dealing with this worrisome trend.[38]

The third most requested form of assistance from the AHA shifts attention to faculty engagement. Recognition of Tuning work in tenure and promotion procedures highlights the importance many historians place on reward systems that can encourage faculty participation.

A fourth request, on introductory Tuning workshops, revealed an interesting set of replies. The group most likely to call for the sessions were cohort members, those who have already participated in introductions to Tuning. Perhaps these responders see a need for periodic "refresher" courses in the work – or perhaps they know from experience that the workshops would be helpful for their colleagues.

Among less popular selections, it is curious to see that few participants from 2-year schools perceive a need to address "naysayers" or critics of Tuning. Perhaps their responses indicate the comparative success of Tuning in community colleges. Two-year faculty were particularly interested in the AHA providing forms of recognition for Tuning work – and for encouraging conversations between 2- and 4-year campuses. Four-year campus faculty were far less likely to call for guidance on the latter issue.

Historians displayed the *least* interest in "revising the AHA Disciplinary Core." Only 3% of replies called for this change, suggesting that the

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[38] Robert Townsend, "Data Show a Decline in History Majors," *Perspectives on History* 51, no. 4 (April 2013), https://www.historians.org/publications-and-directories/perspectives-on-history/april-2013/data-show-a-decline-in-history-majors; James Grossman, "To Be a Historian Is to Be a Teacher," *Perspectives on History* 53, no. 8 (November 2015), https://www.historians.org/publications-and-directories/perspectives-on-history/november-2015/to-be-a-historian-is-to-be-a-teacher; Julia Brookins, "Enrollment Declines Continue: AHA Survey Again Shows Fewer Undergraduates in History Courses," *Perspectives on History* 56, no. 2 (February 2018). https://www.historians.org/publications-and-directories/perspectives-on-history/february-2018/enrollment-declines-continue-aha-survey-again-shows-fewer-undergraduates-in-history-courses.

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organization has done a good job listening to and communicating with members about the informing principles and goals of historical study.

VI. **Conclusions**

The survey was designed to examine the "impact" AHA Tuning. The results call attention *both* to the work of historians and to the complex nature of "impact" itself.[39]

One *formal* way of determining AHA Tuning's impact is to consider the "deliverables" outlined in the original agreement. The Lumina Foundation asked the AHA to work with a large national group of historians, define core competencies in the field, clarify the value of historical study, and build the foundation for meaningful assessment of student learning. In turn, the AHA asked members of its "cohorts" to attend Tuning workshops, work with their campus colleagues to clarify core learning goals, identify key curricular revisions, and explore the career prospects of students.[40] In both cases, the work has been achieved in a thoughtful and engaged fashion

A second approach to the question of impact is to observe the effects of Tuning on the American Historical Association itself. The organization's annual meeting looks different from conferences a decade ago with a greater range of panels focused on teaching, learning, and career opportunities. The institutional affiliations of the AHA's Council and committee members has become more diverse with greater representation from teaching-focused

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[39] For a thoughtful overview of the methodology of impact studies, see: Pablo Beneitone and Maria Yarosh, "Tuning Impact in Latin America: Is There Implementation Beyond Design?," *Tuning Journal for Higher Education* 3, no. 1 (December 23, 2015): 187–216, https://doi.org/10.18543/tjhe-3(1)-2015pp187-216. On questions of "perceived" impact, see: Luigi F. Donà dalle Rose, "Impact of Erasmus Mobility for Study on the Development of Tuning Europe Generic Competences, As Assessed by Outgoing and Incoming Students in a Large University: A Revealing Analysis," *Tuning Journal for Higher Education* 3, no. 1 (2015): 57–98, https://doi.org/10.18543/tjhe-3(1)-2015pp57-98. For a study combining the implementation of Tuning in the EU and US, see: Tim Birtwistle, Courtney Brown, and Robert Wagenaar, "A Long Way to Go . . .: A Study on the Implementation of the Learning-Outcomes Based Approach in the EU," *Tuning Journal for Higher Education* 3, no. 2 (May 2016): 429–63, https://doi.org/doi: 10.18543/tjhe-3(2)-2016pp429-463. On "impact" in the context of formative assessment, see: Fisseha Mikre Weldmeskel and Dreyer Johann Michael, "The Impact of Formative Assessment on Self-Regulating Learning in University Classrooms," *Tuning Journal for Higher Education* 4, no. 1 (2016): 99–118, http://dx.doi.org/10.18543/tjhe-4(1)-2016pp99-118.

[40] "Call for Applications," American Historical Association Tuning Project (2014), http://www.historians.org/projects/tuning/.

institutions. And the AHA offers more regional meetings focused on questions tied to course instruction.[41]

A third way to address "impact," following *in*-formal conversations the author had with Lumina leaders, is to focus on changes in faculty practice. Tuning has not remained an abstract topic of discussion and debate. Participants have not simply focused on declarations of objectives and intentions. Rather Tuning has generated observable shifts in the conduct of coursework, curricular design, assessment, and mentoring, pointing to another achievement of project goals.

A fourth approach to "impact" addresses changes in the "culture" of the discipline.[42] As noted in Section III: 4, historians have long sidestepped calls to examine the actual learning that students have achieved. Colleagues who experienced frustration with older practices of assessment and accreditation have often pulled back from projects that called for critical self-evaluation of disciplinary work and course structure.[43] As Anne Hyde, faculty chair of AHA Tuning, commented, "historians are used to thinking very individualistically and proprietarily about their classrooms, content, and students. . . . What we do has become obvious and natural," seemingly requiring no explanation.[44] Survey results indicate a considerable turnaround in the habits, outlook, and practices of historians. Colleagues have engaged in much more collective, intentional, and transparent work designed to demystify historical study and make implicit assumptions about the discipline explicit for a wider audience.

A fifth consideration of impact addresses how well Tuning has integrated with additional post-secondary reforms in teaching and learning that also focus on outcomes-based, skills-focused, student-centered approaches. "Many colleagues have worked on AHA Tuning in conjunction with other academic projects on teaching and learning," one question stated. "Have any of the following projects formed a part of the discussions and planning in your department?" The survey listed initiatives with fairly wide adoption on U.S. campuses. A follow-up question asked if participants sensed a close connection between Tuning and the other projects.

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[41] Letter, Emily Swafford (AHA Manager of Academic Affairs) to author, February 20, 2018.

[42] Tony Becher and Paul Trowler, *Academic Tribes and Territories: Intellectual Enquiry and the Culture of Disciplines*, 2nd ed (Philadelphia: Open University Press, 2001), 23-25.

[43] Daniel J. McInerney, "A Network of Curricular Connections: Lessons from Cultivating History in the State of Utah," *Journal of American History* 104, no. 4 (March 1, 2018): 966, https://doi.org/10.1093/jahist/jax432.

[44] Hyde, "Five Reasons History Professors Suck at Assessment," 1105.

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Have any of the following projects formed part of the discussions and planning in your department?

Project	% of responses
Essential Learning Outcomes	22%
VALUE rubrics (Valid Assessment of Learning in Undergraduate Education)	17%
LEAP (Liberal Education & America's Promise)	16%
AHA Career Diversity	15%
Assignment Workshops	13%
Electronic portfolios	12%
Degree Qualifications Profile	9%
AQIP Quality Assurance (Higher Learning Commission)	6%

Integration of Tuning with other academic reform projects

Perceived level of integration, Tuning + other projects	% of responses
Tuning offered a central, informing set of assumptions and questions for conversations on student learning	13%
Tuning integrated well with other academic projects	18%
Tuning played a minor role in our discussions	13%
Discussions in my department/academic unit did not place much emphasis on the Tuning project vocabulary used in the project	12%
Tuning appeared to conflict with other projects	0

[45] For information on the ELO, LEAP, VALUE, and e-portfolios, see "AAC&U Programs," https://www.aacu.org/aacu-programs, and https://www.aacu.org/eportfolios. For AHA work on career opportunities, see "Career Diversity for Historians." For assignment workshops and the DQP, see: "DQP: Degree Qualifications Profile," National Institute for Learning Outcomes Assessment, http://degreeprofile.org/, and https://www.assignmentlibrary.org/. For the Academic Quality Improvement Program, see: "AQIP Pathway Overview," The Higher Learning Commission, https://www.hlcommission.org/Accreditation/aqip-overview.html.

Less-commonly noted projects included: core curriculum revisions with General Education programs; the games-based "Reacting to the Past, (https://www.historians.org/teaching-and-learning/teaching-resources-for-historians/reacting-to-the-past); Indiana University's "History Learning Project" (http://www.iub.edu/~hlp/); and "Quality Enhancement Plans" from the Southern Association of Colleges and Schools (http://www.sacscoc.org/QEPSummaries.asp). A few colleagues listed distinctive departmental projects.

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The survey shows that only a minority of respondents indicated the participation of their department in additional teaching and learning projects. But of those who did engage in other reforms, nearly a third perceived a clear sense of connection with their Tuning work. *No* respondents believed Tuning was "in conflict" with any of the projects cited. The outcomes-, skills-, and student-centered nature of these additional initiatives likely reinforces a sense that the projects "converge" rather than conflict with one another. At the same time, when asking faculty to determine the "influence" of AHA Tuning, we should bear in mind that it may be difficult for to distinguish Tuning-*related* projects from Tuning-*caused* activities – and come up with a clear notion of Tuning's specific "impact."

Although survey responses provided only a general sense of colleagues' perceptions, many history departments have extended their engagement with teaching, learning, and assessment through a diverse range of projects. And the historians working on these initiatives tend to see conceptual and procedural links among the reform efforts. Tuning's exact "impact" on the field of history may be difficult to measure precisely, but a good deal of evidence points to the formal, organizational, structural, and cultural changes that the project has promoted in the discipline.

VI.1. *Questions to consider*

Survey results that demonstrate Tuning's effectiveness also shed light on some concerns and problems in the project. Five points hold particular importance as the AHA continues its work:

• *Engagement with students*: A core concern of all Tuning work revolves around building a "student-centered" project. One way to address the needs and interests of students *precedes* the work of altering courses, assignments, and curricula, and involves bringing students into the broader discussion of Tuning itself. Survey results raise questions about the extent to which historians have drawn students into the conversation.

Question 22 asked, "Did your department or academic unit consult with student representatives in any of your discussions on Tuning or related initiatives tied to teaching and learning?" Surveys showed limited work in this area. Nearly half the respondents (from both two- and four-year campuses) stated that "discussions only involved faculty." One in five noted work with students in surveys or focus groups – though these activities were only reported at four-year institutions. And only 5% said that students "attended some of our meetings."

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A half dozen respondents reported work with graduate students, suggesting an effort to bring pedagogical discussions into master's or doctoral level work. Others commented on focused discussions of Tuning with undergraduates in methodological and capstone research classes. But the survey revealed few accomplishments in continuous, systematic integration of faculty and student work on Tuning. This is one issue for the AHA to consider in the future.

• *Outreach*: Another major theme in Tuning emphasizes the importance of broadening discussions of academic learning with diverse groups, bringing in a range of educators, transcending departmental and institutional boundaries, and reaching out to employers, policymakers, and the general public. Survey results indicate, however, that this type of work has been limited and inward-looking. Non-tenure track faculty are left out of most conversations. Cooperative work with other campuses remains limited. And community "stakeholders" in higher education have not commonly take part in the discussions. It may prove useful in future AHA Tuning work to stress the value of hearing from a wide range of voices and interests.[46]

• *Incentives*: As the AHA tries to engage faculty in Tuning, it is reasonable for educators to ask what they might gain from the work in terms of tangible benefits, advantages, or recognitions: "What's in it for me?" The data yielded few clear answers. Responses revealed the decidedly limited state of incentives. It seems appropriate for the AHA to review the types of rewards and encouragements that can best inspire colleagues to continue their valuable work.

• *Enrollment*: Material presented in Section III, 5 makes another point quite clear: despite initial hopes, Tuning has not helped turn around falling course enrollments and declining numbers of declared majors. It may be worthwhile to revisit this issue with fresh eyes to see if department heads and faculty members can propose new ways to use the tools and techniques of Tuning to reverse this unsettling trend.

• *The missing third*: Finally, it is worth recalling two puzzling points raised in Section III: that roughly one-third of respondents believed Tuning discussions had not occurred in their departments; and that roughly one-third also felt Tuning had no influence over some key curricular reforms. I have struggled to understand how these colleagues conceive of Tuning – and how others may have presented the project to them. Perhaps one way to respond to these curious results is for the AHA to consider a request from respondents:

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[46] Daniel J. McInerney, "Tuning History in Utah: Winning Friends and Influencing Policy Makers," *Perspectives on History* 52, no. 4 (April 2014): 14–15, https://www.historians.org/publications-and-directories/perspectives-on-history/april-2014/tuning-history-in-utah.

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to "provide 'introductory' [or refresher] workshops on AHA Tuning at annual conference and regional meetings."

VI.2. *Successes in AHA Tuning*

Survey results point to four key areas of success in the AHA Tuning project:

- The qualities of Tuning most highly emphasized by the AHA – continuous, collective discussion, thoughtful self-reflection, clarification of disciplinary goals and value, intentional curricular and course revision, invigorating pedagogical experimentation, attention to student learning – are also the aspects of the project most commonly implemented by faculty. Historians have clearly engaged with outcomes-based, student-centered, discipline-focused, faculty-led initiatives in teaching and learning, not simply by outlining aspirational goals but in actually reframing the day-to-day work they perform with students.
- Work in Tuning has expanded into a wide range of projects in teaching and learning, building not simply a "collection" of initiatives but a group of thoughtfully-integrated approaches to the intellectual, career, and civic interests of students.
- Lingering concerns with the Tuning project, once fairly common, remain quite muted. Colleagues voice few strenuous objections – and detect few major problems – with the initiative.
- Tuning has helped illuminate significant changes within the disciplinary "culture" of history. The focus and expectations of faculty continue to shift from an emphasis on "my course" to the contributions of "our curriculum," from the "private" nature of teaching to the collaborative efforts in education, and from the "burdens" of accountability and assessment to the knowledge and guidance that the work generates. James Grossman and Emily Swafford, the AHA's executive director and manager of academic affairs, frame all of this as an evolving process in matters of outlook, habit, and values, posing a "radical notion": that "we begin not with what we want to teach but rather with what we want our students to learn."[47]

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[47] James Grossman and Emily Swafford, "Graduate Education Reconsidered," *Perspectives on History* 54, no. 4 (April 2016), https://www.historians.org/publications-and-directories/perspectives-on-history/april-2016/graduate-education-reconsidered

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Tuning through a disciplinary society has sparked tangible, transformative changes among historians – and has helped "scale" reforms in teaching and learning across the U.S.

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‘New Engineering Education’ in Chinese Higher Education: Prospects and challenges

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Abstract: Since becoming a formal signatory of the Washington Accord in 2016, China has outlined an initiative ‘New Engineering Education’ (NEE) to reform its engineering education at university level. This paper elaborates upon the NEE initiative by presenting analysis of its domestic and international context, the goals of the initiative, how the initiative draws upon international standards, major actions under the initiative, and the challenges remaining for NEE to achieve its goals. The paper argues that China views international practices and standards of engineering education in developed nations as highlands to imitate and surpass, and the NEE goals embody an ambitious systematic rather than partial reform of the sector. China has pushed forward the NEE reform with measures such as formulating National Standards for dozens of categories of engineering programs, commissioning 600+ research projects on NEE development, establishing new engineering programs and interdisciplinary courses, strengthening university-partnership, updating accreditation for engineering programs, and improving both external and internal quality assurance mechanism. The sector, however, still faces challenges in achieving systematic quality upgrade due to hindering factors like enlarged uneven resource allocation, downplayed teaching activities and the difficulties in reforming the curricula system. Expected changes are also discussed.

Keywords: Higher Education; Engineering Education; Educational Reform; China; New Engineering Education.

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I. **Introduction**

As the world in 21st century is being and will be further revolutionized by the rapid development of science and technology, engineering skills impact individuals' wages and jobs, determine whether countries survive in the fierce international competitions in the long run, and more importantly, whether our next generation will have the capability to meet the common global challenges in the decades to come. Engineering education sets young generations on paths to becoming successful engineers by teaching them the set of knowledge, skills and attitudes needed to solve complex problems, strengthen productivity, and achieve excellence. Graduates of engineering programs are usually expected to demonstrate special abilities distinguished from other areas like humanities or social sciences. These abilities usually include but are not limited to applying knowledge of math, science and engineering, designing and conducting experiments, analyzing and interpreting relevant data, demonstrating the competences to design systems, components, or processes to identify, formulate and solve engineering problems. For this reason, improving the quality of engineering education is a constant theme of higher education sector across the globe.

In many parts of the world, quality assurance of undergraduate engineering education is guided by the directions and goals of important international accords and agreements pertaining to cultivating engineering talents, such as Accreditation Board for Engineering and Technology (ABET), European Network for Accreditation of Engineering Education (ENAEE), Sydney and Dublin Accords (SDA), the Engineers Competence Agreements (ECA), and so on. For example, ABET sets criteria for accrediting numerous types of engineering programs, covering students, program objectives, student outcomes, improvement measures, curricula, faculty, facilities, and institutional supports that ensure quality assurance of given programs.[1] Another more widely recognized agreement of relevance is the Washington Accord, which works as an important constituent of International Engineering Alliance and is concerned with engineering education and competence in the form of a self-governing and autonomous agreement between signatories of various nations that provide external accreditation to higher education programs. All the signatories must undertake a periodic peer review to ensure the substantial equivalence of the accredited programs, and graduates of accredited programs enjoy the

[1] Ron MacKinnon, Kevin Lee Elder, and John Dyer, "ABET Accreditation of IS and IT Programs in 2013," *Journal of Higher Education Theory and Practice* 16, no. 1 (2016): 20

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privileges of being recognized by other signatories in terms of degrees obtained, thus ensuring that the quality of the commonly recognized advancement does not recess and the mobility of graduates between signatories is guaranteed.

China is no exception from many other countries in terms of the awareness to leverage its engineering education to update its national technological competence. Among various aforementioned accreditation and quality assurance mechanisms, Washington Accord is most directly related to China. Realizing the importance of international recognition and the considerable impacts that Washington Accord has made on improving engineering education worldwide since 1989, China actively prepared for joining other Washington Accord signatories from around 2006 and managed to become a formal member in 2016. The application for and the celebration of joining the Washington Accord signatories has embodied the aspiration of Chinese engineering education sector to move from the periphery towards the center, with one of the phrases most frequently talked about in the Chinese higher education sector being 'substantial equivalence'. This event is regarded as a milestone in China's history of the engineering education's development. One official from China's Ministry of Education said that 'Joining the Washington Accord marks that China's engineering education quality standard has been internationally equivalent to other matured standards, and the quality assurance system for China's higher engineering education has been recognized by the international community'.[2]

China's joining of Washington Accord occurs concurrently with the broader global technological revolution. The concept of 'Industry 4.0', originating from 'Germany 2020 High-tech Strategy' initiated by the German government to revolutionize Germany's core technology competitiveness, got fully known by Chinese during the HANNOVER MESSE in 2014. While 'Industry 4.0' is summarized mostly for the current trend of manufacturing technologies in areas such as cyber-physical systems, the Internet of things, cloud computing and cognitive computing, Chinese media portray such many areas in an astonishing fashion by using another equivalently and even more shocking term 'the Fourth Industrial Revolution' to indicate the urgency of updating its engineering sectors. Xinhua News Agency, one of China's most prominent state media, reports that:

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[2] "What does Entry into Washington Accord Mean to Chinese Engineering Graduates," Chinese Education Daily, accessed July 3, 2018, https://mp.weixin.qq.com/s?__biz=MzA4MTQxOTQzMw==&mid=2650271505&idx=1&sn=b651de4bd4e7159d2276e1248a1bf9f8&scene=0#wechat_redirect.

> This (the fourth) industrial revolution will not be confined to a certain area like before. Mobile network, sensors, nanotechnology, brain research, 3-D printing, material science and computer information processing, to name a few, as well as their interactive functions will all be impacted greatly by the fourth industrial revolution, which is a systematic rather than a single-product-like or single-service-like innovation.[3]

The drastic changes and the grave influences brought by this technological revolution are believed by the Chinese to be more far-reaching than all the previous historical industrial revolutions. The substantial descriptions of the upcoming societal changes driven by implantable techniques, big data, smart cities, automation and many other technological innovations already taking place in powers like the Unites States and Japan render the Chinese to feel a sense of urgency not to lag behind as they did a century ago.[4] Such resolutions to enhancing technological advancement are seen from national strategies to governmental reports and to business schemes.[5]

It was against such two backdrops – the demand to upgrade the engineering education sector to meet standards and criteria set by the Washington Accord, and the demand to cultivate more qualified engineering talents to meet the challenges of the times – that 'New Engineering Education' (NEE) was proposed.

This paper is organized into five sections. In Section 'NEE: what are the new intentions', we begin the paper by presenting the goals, contents of the three NEE policy documents issued by China's Ministry of Education, highlighting the 'new' elements compared with the existing engineering education system in China. Then we present an analysis of how NEE visions reflect the standards and criteria set by some internationally renowned agreements pertaining to engineering education, especially the Washington Accord of which China has proudly claimed to be a member in Section 'Reflections of international standards in NEE'. Section 'Actions under the NEE initiative' proceeds to analyze the primary impacts of NEE policy on Chinese higher education institutions over the past year since the catchphrase

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[3] "The Fourth Industrial Revolution: A Grand Social Change Sweeping the Globe," Xinhua News Agency, accessed July 6, 2018, http://www.xinhuanet.com//book/2016-06/06/c_129042664.htm.

[4] Klaus Schwab. *The Fourth Industrial Revolution* (Geneva,Switzerland: World Economic Forum, 2016), 66

[5] Jinping Xi, "Securing a Decisive Victory in Building a Moderately Prosperous Society in All Respects and Strive for the Great Success of Socialism with Chinese Characteristics for a New Era," accessed May 1, 2018, http://www.xinhuanet.com/english/download/Xi_Jinping's_report_at_19th_CPC_National_Congress.pdf.

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was put forward. Next, in Section 'Challenges for China's NEE', we gesture to several challenges to be addressed if China wants its NEE visions to be fully realized. Finally, the possible consequences of China's NEE are discussed in 'Discussion'.

II. **NEE – what are the new intentions?**

'New Engineering Education'(NEE) refers to a reform initiative aimed at upgrading China's engineering education at university level against the backdrops of the global 'industry 4.0' technological revolution and China's joining the Washington Accord agreement. The ideas and visions of NEE are embodied in the three policy documents issued by China's Ministry of Education in 2017, namely 'Fudan Consensus',[6] 'Tianda Action'[7] and 'Beijing Compass'.[8] The three documents were issued in sequence as outputs of three meetings held at Fudan University, Tianjin University and Beijing Convention Center respectively in the same year. Each of the three policy documents addresses different facets of the holistic reforms to be implemented, and the three documents combined depict a blueprint of China's production of engineering talents through its tertiary education in the decade ahead. For example, the visions of developing a multiplicity of entities at various levels to facilitate engineering education such as universities of science and technology, colleges of industrialization, new polytechnic programs, new curricula, new praxis platforms, cross-disciplinary platforms, and industry-oriented innovation platforms depicted in 'Beijing Compass' signal a strong imagination of systematic engineering upgrade at both macro and micro level, thus rendering the picture of how China is going to develop its technology manpower not fully understood with NEE left unchecked.

The first of the three policy documents 'Fudan Consensus' is of relevance to the differentiated roles played by various stakeholders of higher education. Stakeholders identified in the document include higher education institutions

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[6] "'Fudan Consensus' for 'New Engineering Education' Development," MOE(Ministry of Education) China, accessed June 1, 2018, http://www.moe.edu.cn/s78/A08/moe_745/201702/t20170223_297122.html.

[7] "'Tianda Action' for 'New Engineering Education' Development," MOE(Ministry of Education) China, accessed June 1, 2018, http://www.moe.edu.cn/s78/A08/moe_745/201704/t20170412_302427.html.

[8] "'Beijing Compass' for 'New Engineering Education' Development,". MOE(Ministry of Education) China, accessed June 1, 2018, http://www.moe.edu.cn/s78/A08/moe_745/201704/t20170412_302427.html.

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strong in engineering programs, comprehensive universities, local universities and colleges, government bodies at all levels, and relevant social forces. With respect to higher education institutions, those having renowned engineering education programs are expected to take more advantage of the close ties with the industry to optimize existing disciplines and programs and promote interdisciplinary development, while comprehensive universities are expected to promote the extension of applied science to engineering and cross-discipline integration. Local universities in the meantime are required to respond to local economic demands by producing a large number of skillful talents with strong knowledge in the industry and strong application ability. Governments are asked to provide major supportive measures by strengthening policy consistence and forging united strengths from all relevant stakeholders. Enterprises and industries are encouraged to participate in all phases of education and teaching in order to ensure that engineering education matches industries' demands.

The second document 'Tianda Action' identifies a number of major respects on which engineering education must improve. The use of juxtaposition of six subheads put in a unified language formula especially grasps attention, with each subhead indicating an area to investigate and a goal for NEE reform to achieve. The language format of subheads all follow the pattern of 'studying + (an area) + to (work on) + (an aspect), in order to (achieve a goal)', which strikes a visual, audio and rhetorical effect on the readers. By going through the parallelism used, readers can vividly imagine an overall atmosphere of a stronger national capability to cultivate science and technology graduates based on the improvement of a large number of detailed aspects. The aspects identified to work on include investigation into industrial needs, course upgrade, teaching methods, accountability, resource mobility, and setting standards with reference to international yardsticks (Table 1).

The third document 'Beijing Compass' mainly pertains to the emphasis on the five areas to which NEE is to be developed with mounting attention – conceptual update, structural optimization, pattern innovation, quality assurance, and categorical development – as well as the expected outcomes of the whole reform after measures on those five areas are put in place. Detailed contents portrayed of the five areas are not presented here due to spatial constraints. For each area of the five, existing problems in the current engineering education sector to be resolved are identified. For example, on the area of pattern innovation, it writes that 'the barriers that prevent extensive social participation in the development of engineering education must be overcome by improving a mechanism of multi-agent collaborative education based on closer bonds between scientific development and engineering

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education, between industrial advancement and higher learning, and between universities and enterprises'. Apart from the five areas, the expected outcomes of NEE are presented in this document as well, which is to produce nine 'multiplicity' when the reform is finished. These outcomes include:

- a multiplicity of high-quality universities of science and technology
- a multiplicity of colleges of industrialization co-developed and co-managed by multi-agents
- a multiplicity of new polytechnic programs that meet industry demands
- a multiplicity of new curricula that reflect the state-of-the-art technology
- a multiplicity of praxis platforms that integrate education, training and R&D
- a multiplicity of highly professional instructors with strong competence in engineering praxis
- a multiplicity of cross-disciplinary platforms for the R&D of new technologies
- a multiplicity of local industry-oriented platforms for technological innovation
- a multiplicity of transferable reform outcomes

The 'new' element in 'New Engineering Education' is accentuated in mainly two folds. Firstly, it refers to an array of new programs to be established to meet the newest economic and industrial demands. The demand for manpower in emerging industries such as AI in China is believed to far outstrip supply in the years to come. It is reported that by 2020, the shortage of human power in industries of information and technology, electronic equipment development, high grade CNC machine manufacturing, robotics and new materials is to reach 7.5 million in China, while this number rises to 9.5 million by 2025 (Table 2).[9] The dramatic development of state of the art technologies such as big data, artificial intelligence, and the new businesses these technologies result in also have a big manpower chasm to fill in Chinese society. The ratio of supply and demand in China's AI industry is reported to be only 1:10.[10] While universities do not have to add new programs to match every emerging industry, it is generally believed that a large number of new programs need to be launched to respond to the rapid

[9] "Compass for Developing Talents in the Manufacturing Industry," MOE(Ministry of Education) China, accessed August 2, 2018, http://www.moe.edu.cn/srcsite/A07/moe_953/201702/t20170214_296162.html.

[10] "AI Talents Shortage in China over 5 Million in China, Supply Demand Ratio just 1:10,"People's Daily, accessed August 10, 2018, https://gaokao.chsi.com.cn/gkxx/zybk/zyybk/201707/20170714/1619748158.html.

technological revolution happening across the globe. Secondly, the 'new' element refers to the necessity of upgrading existing engineering programs into new ones. Increasing the proportion of practice-related elements into existing engineering programs has become a consensus in the sector. Curricula renewal, teaching methods, governance and many other factors influencing the quality of engineering education are expected to be updated according to industrial demands and international standards.

No matter it's the 'new' program to be established or existing programs to be updated, NEE puts a prominence on promoting connectedness among different disciplines as an approach to educating prospective engineers at higher education institutions. The understanding behind is the importance of an integrated curricula system in developing students' comprehensive skills to solve complex engineering problems drawing on necessary theories and skills of application from a broad range of disciplines.

Table 1

The six subheads juxtaposed in NEE document 'Tianda Action'

No	Original Subhead	Translation
1	问产业需求建专业，构建工科专业新结构	Studying demands of industry to establish and develop programs, in order to institute a new structure for engineering programs
2	问技术发展改内容，更新工程人才知识体系	Studying technological development to change contents, in order to upgrade the system for cultivating engineering talents
3	问学生志趣变方法，创新工程教育方式与手段	Studying students' interest to change methods, in order to innovate teaching approaches and measures for engineering education
4	问学校主体推改革，探索新工科自主发展、自我激励机制	Studying institutions' accountability to promote reform, in order to explore mechanism for self-development and self-motivation
5	问内外资源创条件，打造工程教育开放融合新生态	Studying resources available to create conditions, in order to build an open and inclusive engineering education
6	问国际前沿立标准，增强工程教育国际竞争力	Studying international frontiers to set standards, in order to enhance engineering education's global competitiveness

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Table 2

Projections of manpower in ten key manufacturing industries in China

No.	Area	Year 2015	Year2020		Year2025	
		Manpower	Projected Manpower	Manpower Shortage	Projected Manpower	Manpower Shortage
1	New generation of Information & Technology Industry	10,500,000	18,000,000	7,500,000	20,000,000	9,500,000
2	Advanced CNC Machine & Robotics	4,500,000	7,500,000	3,000,000	9,000,000	4,500,000
3	Aerospace Equipment	491,000	689,000	198,000	966,000	475,000
4	Marine Engineering Equipment & Hi-tech Watercraft	1,022,000	1,186,000	164,000	1,288,000	266,000
5	Advanced Rail Transit Equipment	324,000	384,000	6,000	43,000	106,000
6	Energy-saving & New Energy Vehicles	170,000	850,000	680,000	1,200,000	1,030,000
7	Electronic Equipment	8,220,000	12,330,000	4,110,000	17,310,000	9,090,000
8	Agricultural Machinery Equipment	283,000	452,000	169,000	723,000	440,000
9	New Materials	6,000,000	9,000,000	3,000,000	10,000,000	4,000,000
10	Biomedicine & Hi-performance Medical Equipment	550,000	800,000	250,000	1,000,000	450,000

III. **Reflections of international standards in NEE**

Appearing a total of 18 times across the three policy documents, the word '国际' meaning 'international' in Chinese language signals both means and end that China pursues. While attempting to develop NEE with Chinese characteristics, China still views engineering education in the developed

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nations and relevant international frameworks as highlands to imitate and surpass. That's why China regards joining Washington Accord as a milestone of its engineering education history. Regarding this, it has to be said that while the three NEE policy documents are not specific knowledge profiles or skill portfolio for engineering graduates to master, they do draw upon essences of the core spirit of internationally recognized agreements as to the operation of engineering education.

A core part of the Washington Accord is the 12 graduate attributes involving expectations of students on their engineering knowledge, problem analysis, design/development of solutions, investigation using research methods, modern tool usage, the engineer and society, environment and sustainability, ethics, individual and teamwork, communication, project management and finance, and life-long learning. Most of these elements are adapted into NEE's conceptions. For example, as the ability to work with complexity and uncertainty is a defining characteristic of professional engineer in the Washington Accord,[11] NEE absorbs the spirit by accentuating the need to facilitate engineering education based on carrying out increasing interdisciplinary talent training model. It writes that '(it's necessary to) establish new interdisciplinary organizations, offer students interdisciplinary courses, explore curricula patterns oriented to solving complex engineering problems, establish interdisciplinary teaching teams, set up interdisciplinary project platforms, and promote interdisciplinary and collaborative learning'.[12] In response to 'individual and teamwork' in Washington Accord that requires students to function effectively as individuals and members in diverse teams and multi-disciplinary settings, NEE holds that '(it's necessary to) explore an educational pattern that meets individualized needs, encourage students under instructors' guidance to freely select programs and courses in line with their own academic interest and career planning.[13] Similarly, in response to the 'modern tool usage' that calls for the creation, selection and application of appropriate techniques, resources and modern engineering tools, NEE holds that '(it's necessary to) promote further integration of information technology and

[11] IEA (International Engineering Alliance), *25 Years Washington Accord: Celebrating International Engineering Education*

Standards and Recognition (Wellington, New Zealand: International Engineering Education Alliance Secretariat, 2014), 8.

[12] "'Beijing Compass' for 'New Engineering Education' Development," MOE(Ministry of Education) China, accessed June 1, 2018, http://www.moe.edu.cn/s78/A08/moe_745/201704/t20170412_302427.html.

[13] "'Beijing Compass' for 'New Engineering Education' Development," MOE(Ministry of Education) China, accessed June 1, 2018, http://www.moe.edu.cn/s78/A08/moe_745/201704/t20170412_302427.html.

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engineering education and innovate teaching methods under the context of 'internet +' in order to improve the overall efficiency of education and learning.'[14] In addition, the ideas of Washington Accord on educating engineering students such as increasing praxis and practical education, emphasizing problem-oriented and cooperative learning, and building up closer ties between universities and industries are well absorbed into the formulation of the three NEE documents.

Apart from the Washington Accord, NEE draws upon other internationally recognized agreements to plan the development of China's engineering education as well. For instance, when it comes to teaching and learning process, which is an important standard of EUR-ACE framework as well as the CDIO approach that aim to ensure graduates to demonstrate certain knowledge, understanding, skills and abilities by supporting active learning and integrated learning experiences,[15,16] NEE in response regards changing teaching methods in accordance with students' interest and learning science as an important dimension in which reform is supposed to take place. A paragraph is especially made in 'Tianda Action' on studying students' interest to innovate teaching methods, which specifies the urgency and necessity to 'build up a student-centered concept, enhance faculty-student interaction, reform teaching methods and assessment methods in order to form a learner centered engineering education pattern'. It also sets a goal that 50% of all undergraduate engineering students participate in relevant scientific programs during their academic years at school by extensively building up praxis platforms.[17] As for the internal quality assurance which is another yardstick of EUR-ACE that expects a defined and documented procedure for reviewing engineering programs at regular intervals, NEE employs a fairly lengthy paragraph to address how China is to focus more on quality assurance. Apart from measures to be further taken such as issuing quality standards for all science and engineering programs, building up internationally substantially equivalent accreditation system, and formulating

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[14] "'Beijing Compass' for 'New Engineering Education' Development," MOE(Ministry of Education) China, accessed June 1, 2018, http://www.moe.edu.cn/s78/A08/moe_745/201704/t20170412_302427.html.

[15] "EUR-ACE Framework Standards and Guidelines (EAFSG)," ENAEE, accessed Oct 13, 2018, http://www.enaee.eu/wp-assets-enaee/uploads/2017/11/EAFSG-Doc-Full-status-8-Sept-15-on-web-fm.pdf.

[16] Peter Gray, "CDIO Standards and Quality Assurance: From Application to Accreditation," *International Journal of Quality Assurance in Engineering and Technology Education* 2, no. 2 (2012): 34

[17] "'Tianda Action' for 'New Engineering Education' Development," MOE(Ministry of Education) China, accessed June 1, 2018, http://www.moe.edu.cn/s78/A08/moe_745/201704/t20170412_302427.html.

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engineering program-oriented faculty evaluation standards and promotion mechanism, it also emphasizes the necessity to come up with a multi-agent evaluation mechanism to assure the quality of engineering programs. Besides, the emphasis on promoting faculty members' engineering experiences and exposure to real engineering contexts in NEE documents is at one with numerous international agreements on engineering education including EUR-ACE framework, APEC engineer framework, and CDIO approach. The lack of sufficient engineering experiences in Chinese engineering has been repeatedly spotted in NEE documents as a severe barrier constraining the overall upgrade of the engineering education sector.

It's worth noting that NEE is not a procedural regulation despite that it embodies the latest aforementioned internationally recognized ideas on developing engineering education. It charts out a picture of systematic engineering strengths at both macro and micro level, which are based on developing the sector in line with and even in a more vigorous manner than the international standards such as the Washington Accord graduate attributes. Rather than solely focusing on enhancing students' learning at school, which is an important goal of NEE documents, NEE attempts to implement the reform by renewing the overall ecosystem of the engineering education sector into a more open one where students' four years' educational experiences at school are benefited by multiple stakeholders. This attempt could be a success if right measures on cultivating cross-disciplinary talents are put in place as it embodies the student-focused idea reflected by the numerous international agreements. However, there is also possibility of 'putting the cart before the horse' if a commensurate evaluation system is not put in place to truly shift the focus back to teaching and learning, upon which I will elaborate in the final section of the paper.

IV. **Actions under the NEE initiative**

A number of major efforts have been made to promote the reform of the engineering education sector since NEE series documents were issued in 2017, the most influential of which has been the formulation of the first edition of national standards (National Standards hereafter) on teaching quality for a total of 92 *categories* of specialties.[18] As mentioned, NEE is not

[18] "Information Briefing on National Standards of Undergraduate Programs," MOE(Ministry of Education) China, accessed June 10, 2018, http://www.moe.gov.cn/jyb_xwfb/xw_fbh/moe_2069/xwfbh_2018n/xwfb_20180130/201801/t20180130_325928.html.

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a concrete procedural regulation, and therefore the formulation of National Standards attempts to be a follow-up of NEE guiding policies. Besides, the Ministry of Education has also commissioned hundreds of research projects to scholars nationwide to study engineering education sector to be updated on many fronts. Pilot attempts to develop interdisciplinary courses, strengthening university-industry partnerships and carrying out accreditation for engineering programs are other efforts.

IV.1. *Formulation of National Standards for a multiplicity of categories of programs*

According to the *Catalogue of Specialty* issued by China's Ministry of Education,[19] category is a unit at a higher level than program, and a category may include a few specific programs. For instance, under the category of forestry, there are a number of specific programs such as forest engineering, wood science and engineering, and forest chemical. Similarly, the category of electronic information includes a total of 16 programs such as telecommunication engineering, microelectronics science and engineering, photoelectric information science and engineering, integrated circuit design and integration system engineering, electromagnetic fields and wireless technology engineering and so forth. Calculated in this way, the National Standards issued in early 2018 cover a total of 587 undergraduate programs, approximately half of which are engineering-related.

The National Standards for each category of specialty includes exogenous and endogenous requirements of the program's development. The exogenous requirements include goals for learning outcomes, length of schooling, degrees awarded to qualified graduates, referential credits to be earned, faculty student ratio, expectations of faculty members' background, environment for faculty development, education facilities buildup, technological resources, institutional investment in the program, quality assurance mechanism, and so on. Endogenous requirements are more about the curricula that are supposed to be established, such as gateway courses, prerequisite courses, core courses, special courses, laboratory courses, internships, capstone projects and so forth. For instance, the National Standards for the Category of Electronic Information stipulates that the

[19] "Catalogue of Specialty (2012 version)," MOE(Ministry of Education) China, accessed June 10, 2018, http://old.moe.gov.cn/publicfiles/business/htmlfiles/moe/s3882/201210/143152.html

student faculty ratio for all the programs under this category must be less than 25:1, and the minimum number of full time instructors for every program must be equal to or higher than 10. It also sets 35% as the baseline for a program's full time faculty members with a PhD degree, while this percentage for those with a master's degree at least is set 60%. Besides, it requires that a program ensures that at least 20% of all its faculty members possess working experiences in enterprises or other forms of practical engineering experiences, and faculty members with a title of associate professor and above must account for at least 30% of all members within each of the program. With respect to endogenous requirements, apart from prerequisite courses such as advanced mathematics, engineering mathematics, advanced physics, and a few other general courses, the National Standards stipulates that the program of telecommunication engineering, for example, must include four modules of basic courses out of six from communication theory, digital signal processing, theoretical basis of information, information networks, communication circuit and system, and engineering graphics. In addition to the prerequisites and basic courses, telecommunication engineering programs must also offer students core courses including digital communications, theoretical basis of communication networks, modern switching technology, multimedia communication, wireless communication, broadband access and internet communication, antennas and radio waves, optical communications and optical networks, mobile internet and terminal, radio-frequency technology, satellite communications, and mobile communications as required.[20]

According to relevant officials in charge in the Ministry of Education, the formulation of the National Standards is a systematic project based upon hundreds of seminars and discussions involving more than 5,000 experts and professionals led by committees for each of the 92 categories of specialties.[21] Taking National Standards for programs under the Medicine Category for example, before the formulation of the standards, the preparatory efforts made included administering 15,000 questionnaires, setting up 16 projects, establishing a database of program status, investigated and surveyed approximately 50 representative pharmacy colleges and universities, 60 pharmaceutical praxis bases and 30 employers within the field, which

[20] TCMOE(Teaching Committee of Ministry of Education), *National Standards on Teaching Quality for Undergraduate Programs* (Beijing: Higher Education Press, 2018): 304-314.

[21] "Information Briefing on National Standards of Undergraduate Programs," MOE(Ministry of Education) China, accessed June 10, 2018, http://www.moe.gov.cn/jyb_xwfb/xw_fbh/moe_2069/xwfbh_2018n/xwfb_20180130/201801/t20180130_325928.html.

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provided abundant data to support the formulation of the program standards. Moreover, more than 80 medicine-related experts and 20 some professionals from the pharmaceutical industry participated in the formulation.[22] Having been formally issued in 2018, the National Standards are scheduled to wield influences as guidance on the formulations of detailed plans of program education and the implementations of basic development requirements for public higher education institutions across China.

IV.2. *Commissioning 600+ research projects on NEE development*

In line with a message conveyed by one of the three NEE documents – Beijing Compass that NEE development requires further research of various fronts such as how to realize 'new idea', 'new structure', 'new pattern', 'new quality', and 'new system', the Ministry of Education has had 612 research projects commissioned by scholars from hundreds of universities across the country,[23] among which 202 projects are pertaining to the comprehensive reforms of NEE while 410 projects are of relevance to engineering program reform.

Examples related to comprehensive reforms of NEE include projects entitled 'Establishment of a Multidisciplinary Curricula System to Produce Engineering Talents', 'Explorations and Practices of Updating Traditional Engineering Programs in a New Industry and New Technology-oriented Context', 'Smart Engineering and Creative Design', 'NEE-oriented Engineering Praxis Education and Praxis Base Development ', and so on, while those related to specific engineering program reform include projects such as 'Exploring Establishment of Curricula System for Artificial Intelligence Program', 'Reform and Practices of Data-centered Computer Engineering', 'Exploration of the Pattern of "VR+Education" under NEE Context', 'Building Course System for the NEE Underpinning Course – Physics' and many others.

It's worth speaking that heeding international experiences is also a salient feature among the 612 projects approved. Cross-nation-related projects can be divided into mainly two major categories. One category is

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[22] "Information Briefing on National Standards of Undergraduate Programs," MOE(Ministry of Education) China, accessed June 10, 2018, http://www.moe.gov.cn/jyb_xwfb/xw_fbh/moe_2069/xwfbh_2018n/xwfb_20180130/201801/t20180130_325928.html.

[23] "Announcement of NEE Research Projects, " MOE(Ministry of Education) China, accessed June 18, 2018, http://www.moe.gov.cn/s78/A08/A08_gggs/s8468/201801/t20180123_325345.html.

comparative study of international experiences and lessons on engineering education development and reform, exemplified by projects such as 'Comparisons and Lessons of International Engineering Education Reform Experiences', 'Explorations and Practices of Educational Patterns fit for NEE with International Features', 'International Multidisciplinary Engineering and Technological Talents Cultivation Praxis Supported by Open Channel Bridging Undergraduate and Graduate Education'. The other type pertains to the internationalization of Chinese engineering programs like 'Development of Praxis Competence of Students of Sino-Foreign Joint Engineering Programs Oriented towards International Industrial Demand', 'New Patterns of Internationalization of Rail Transit-related Programs under the Belt and Road Initiative', 'Study of Internationalization of Architecture-related Programs' and many others.

For all intents and purposes, the Ministry of Education hopes through commissioning these research projects that NEE moves forward on an evidence and research-based ground, drawing upon a deeper understanding of the inner requirements of engineering disciplines and successful experiences of international peers.

IV.3. *Establishment of new programs and interdisciplinary courses at higher education institutions*

Many universities in China have developed resources to establish a number of new programs over the past year in line with one of the basic requirements of NEE policy documents, which is to establish new programs catering to new industrial demands. A majority of these newly established programs are engineering programs. It is expected that the new programs set up adopt an idea of 'concurrent engineering'[24] by requiring students to learn different modules of knowledge at the same time that only belonged to different programs in the past. For example, seeming hallow at first glance, the program of 'Internet of Things' in fact requires students to learn courses from different tracks during their four years covering information technology, sensor technology, embedded system technology, security insurance etc. Therefore, not every university is entitled to setting up whatever new programs they want. It's worth mentioning that every university has to apply first to the Ministry of Education and obtain approval if they want to set up a

[24] Paulo Davim, *Mechanical Engineering Education* (London: Hoboken, NJ: ISTE, Ltd., 2012), 89

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new program. Otherwise, the newly established programs without approval are not entitled to granting graduates graduation certificates. The Ministry of Education goes through a procedure to evaluate all the applications and offer permissions to institutions that only pass relevant standards.

One example of the new programs approved is the 'Program of Intelligent Architecture' at Tongji University in Shanghai, a renowned university boasting its architecture-related programs. The new program makes civil engineering as its core, incorporating elements from other majors like urban planning, mechanical engineering and electronic and information engineering, in order to guarantee that the element of 'intelligent' takes good advantage of both traditional theoretical foundations in architecture and modern means of information technology. In terms of qualifications to set up the new program, Tongji University is the only higher education institution permitted to launch 'Program of Smart Architecture' in 2018 based on its proven manpower and hardware resources.

Even with the Ministry of Education's stance to sift programs applied, there has been a prevalent momentum of setting up new programs at universities across the country. Among all the programs newly added, data science or big data technology, robotics engineering, artificial intelligence are the hottest keywords. According to Ministry of Education's announcement of approved newly-established programs across Chinese universities in 2017, a total of 250 universities newly established the program 'Data Science and Big Data'[25] as a result of the nation's emphasis on the advancement of data technology and data industry over the years. 'Robotics Engineering' was established by 60 universities, and 15 universities initiated 'New Energy Materials and Devices'.[26] Other emerging programs claimed to future-oriented include 'Smart Medical Engineering', 'Artificial Intelligence' and so on.

Apart from the attempt to cultivate artificial intelligence talents by setting up new programs, more than 10 first-tier universities such as Tsinghua University and Nanjing University have formally kick started a school of artificial intelligence as an independent department. This number is projected to continue to increase in the years ahead as the Ministry of Education has set

[25] "Verification of Undergraduate Programs Applied in 2017," MOE(Ministry of Education) China, accessed July 20, 2018, http://www.moe.gov.cn/srcsite/A08/moe_1034/s4930/201803/t20180321_330874.html.

[26] "Verification of Undergraduate Programs Applied in 2017," MOE(Ministry of Education) China, accessed July 20, 2018, http://www.moe.gov.cn/srcsite/A08/moe_1034/s4930/201803/t20180321_330874.html.

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a goal of having approximately 50 such departments across the nation by 2020.[27]

In addition to the establishment of new programs, many universities have attempted to adjust their course groups to develop interdisciplinary courses and increase the interdisciplinary features of existing courses. The promotion of cross-disciplinary connectedness is mostly carried out via two means. First is the enhancement of connectedness of engineering courses and their related disciplines. At one university in Anhui Province, for example, in the past students of the program of electronic information engineering would spend most time learning theoretical courses of 'signal and system', 'digital speech processing', 'digital image processing', 'digital signal processing' and 'complex variables functions' when it comes to signal-related fields. In the past year, the university has added project-based courses of 'FPGA chip technology', 'DSP chip technology', 'deep learning: speech recognition' and 'DSP & machine vision' based on previous courses to enable students' deep exposure to the curricula group. Moreover, courses of 'C programming language' and 'EDA technology and application' from the related disciplines are also provided to students.[28] The second measure adopted by many institutions is to enhance the connectedness of engineering disciplines and humanities. This attempt is reflected by many courses whose names include 'design thinking', 'innovation and entrepreneurship' or 'sustainable development' which usually require both engineering skills and visions of the future. In Tongji University, there were 96 interdisciplinary courses scheduled to be provided for students of Year 2018,[29] while Southwest Jiaotong University just finished developing 30 interdisciplinary courses to be delivered,[30] to name a few. To ensure the effective implementation of interdisciplinary courses provision, many universities have re-edited relevant regulations to align the relationship between core courses, minor courses, and elective courses.

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[27] "Higher Education Institutions AI Innovation Initiative," MOE(Ministry of Education) China, accessed July 28, 2018, http://www.moe.gov.cn/srcsite/A16/s7062/201804/t20180410_332722.html.

[28] Shishu Yin, Songtao Wang, and Kaiyu Duan. "On the Course Group Construction for Signal Processing in the Context of New Engineering," *Journal of Changsha University* 32, no. 2 (2018): 127.

[29] "NEE Explorations by Tongji University," Tongji University, accessed October 8, 2018, https://news.tongji.edu.cn/classid-18-newsid-57831-t-show.html

[30] "SWJTU issued 30 cross-disciplinary courses for selection," Southwest Jiaotong University, accessed October 8, 2018, http://dean.swjtu.edu.cn/servlet/NewsView?NewsID=1DC26A9BDF189B17.

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IV.4. *Strengthening university-industry partnership*

For a long time, China's engineering education has fallen short of its international peers because of insufficient university-industry partnerships.[31] A deeper and more extensive collaboration between university and industry has been once again placed a high value under the NEE context. In response to the international standards in which university-industry partnership constitutes a central component of engineering education,[32] Chinese universities have been more aware of the importance and been more committed to establishing closer university-industry ties to facilitate the quality of engineering education.

The past few years have witnessed the growth of university-industry partnerships as well as the environment supporting such partnerships in China compared with before, featured by a large number of higher education institutions having established outside-campus internship bases in collaboration with businesses and other practitioner organizations. University technology transfer centers, university science parks, university-industry cooperative laboratories, university-affiliated state key laboratories, and internship bases have sprung up across the nation as forms of collaboration between higher education institutions and industries.

In addition, many higher education institutions have formulated relevant policies to require their instructors to work in business or relevant industry organizations for at least half a year if the instructors want to get promoted smoothly. To name a few, People's Public Security University of China, a police-training university with engineering programs such as forensic science and traffic management, have established internship bases with police bureaus across the nation. Not only students are required to have 3-month internships at corresponding bases outside school before they graduate, it is also a must for instructors to work in a cooperative police bureau station for at least six months. Shanghai University of Engineering Science has worked with the company Shentong Metro to co-establish a praxis base where its faculty and staff can be more exposed to industry manufacturing procedures. Nanjing University of Posts and Telecommunications (NUPT), a relatively big name for electronics and information engineering programs in China, have instituted a mechanism called 'three ins and three outs' to strengthen the linkage with

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[31] Zhenyi, Guo and Stephen Lamb. *International Comparisons of China's Technical and Vocational Education and Training System* (Dordrecht: Springer, 2010), 20.

[32] Ruth Graham. *Achieving Excellence in Engineering Education --- The Ingredients of Successful Change* (London: Royal Academy of Engineering, 2012), 41.

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the information industry. 'Three ins' refers to the policy of bringing in industry expertise to classroom, developing laboratories co-established by the university and the industry, and bringing in curricula developed by enterprises in the relevant industry. 'Three outs' means sending out instructors to enterprises to enhance their industry experiences, sending out students to enterprises for internships, and sending out students to enterprises for the capstone projects before they graduate. Meanwhile, a set of curricula related to career development and sales management in telecommunications are co-developed by NUPT and some telecommunications giants like ZTE. In all these aforementioned universities, there are stipulated policies that without industrial experiences, the promotion is not feasible for instructors no matter how many publications they produce. These measures have indicated growing efforts of strengthening university-industry partnerships in the Chinese engineering education sector.

IV.5. *Accrediting Engineering Programs*

Consisting of 33 group members and some individual members, Chinese Engineering Education Accreditation Association (CEEAA) is the major organization responsible for accrediting Chinese engineering programs. Under the NEE context, CEEAA has placed a high value on the rigorous accreditation process to ensure that all accredited programs truly meet international standards set by the Washington Accord of which China strived to become a member. In the meantime, application for being accredited has much grown from Chinese universities in that joining Washington Accord indicates that the individual engineering programs accredited in China is also recognized by other international signatories, which could benefit the universities in terms of program brand, international mobility and student quality.

In Nov 2017, CEEAA issued an updated version of 'Guidance on the Engineering Education Accreditation Self-assessment Report'[33] ('Guidance' hereafter) to raise expectations on individual higher education institutions that hope to apply for accreditation. Filling the report is the first step in the whole application procedure. The Guidance requires institutions to report on seven major aspects of program operation, including students, program

[33] "Guidance on the Engineering Education Accreditation Self-assessment Report," China Engineering Education Accreditation Association, accessed June 23, 2018, http://www.ceeaa.org.cn/main!newsTop.w?menuID=01010704.

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goals, graduate attributes, mechanism of ongoing improvement, curricula system, faculty members and supporting facilities. The seven aspects are detailed in Table 3.

The formulation of the Guidance takes consideration in both international standards and Chinese higher education reality. It can be seen that each of the seven aspects has a number of major expectations with various detailed indicators to measure the actual performance of the program. It's worth noting that the 'Graduate Attribute' part of the Guidance, which is a core part, draws entirely on Washington Accord except for just one minor difference on the aspect of 'Communication'. It indicates that Chinese engineering education sector has completely used the internationally recognized standards as a basic yardstick to measure its own programs. The minor difference is the addition of 'communicating effectively in a cross-culture setting with global visions' to the aspect 'Communication', which further embodies China's determination to get fully integrated into the international community and push forward internationalization. This echoes the aforementioned point that China still views 'international' standards led by developed nations as highlands to reach.

Among a total of 19,000 plus engineering programs across all Chinese higher education institutions, 846 programs of 196 universities have been accredited as of yet.[34] Currently, Chinese higher education institutions produce approximately 1.2 million engineering graduates every year. Those who graduate from the accredited programs are entitled to equivalent recognition by other Washington Accord signatories when they seek employment in relevant signatory countries, thus having more advantages than their fellow students who graduate from non-accredited programs.

[34] "Engineering Program Accreditation Covering 21 Categories, Expecting Full Coverage by 2020," China Engineering Education Accreditation Association, accessed June 23, 2018, http://www.ceeaa.org.cn/main!newsView.action?menuID=01010401&ID=1000011710.

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Table 3

Guidance on Engineering Education Accreditation Self-assessment Report

Aspect	Expectation	Indicators
Students	Establishing mechanism to attract outstanding students	Existing sources of students in admission and streamlining procedures
		Regulations formulated and measures taken to attract outstanding students and how well they are implemented
		Analysis of changes of variation of source of students based on external factors such as admission policies, employment environment, as well as measures to cope with the changes
	Taking measures to improve student counseling, career development, employment guidance, psychological guidance	Regulations and measures to guide students' learning, career planning, employment guidance, psychological counseling
		Contents and effects of all types of relevant guidance and counseling, including ways of guidance or counseling, implementer, and frequency of delivering guidance
		How guidance or counseling help students understand requirements on graduation, and course achievement, especially how instructors guide students to clarify learning goals, master effective learning methods and meet learning expectations.
	Tracking students' learning process	Report on program stipulations on students' graduation and acquisition of degrees
		Ways of tracking students' ongoing performance at school
		Early warning system and assistances to students with academic difficulties
	Mechanism of recognizing program transfer and previous credit	Schemes, procedures and responsible persons to recognize programs' new comers' previous credits in another program
		Provision of specific cases of accepting transferred students, evidences and procedures of recognition of previous credits

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Aspect	Expectation	Indicators
Program Goals	Open, realistic goals catering to social and economic development	Complete written description of program goals, including areas of employment for graduates, job features and skills needed
		Elaboration upon the relationship of program goals, university positioning, talent orientation and social and economic development
		Channels of making program goals available to general public, and how students, instructors and the society understand the goals
	Periodic regulation of reasonability of program goals and revision of goals	Regulations and measures to evaluate the reasonability of program goals
		Contents of reasonability of program goals
		Methods of evaluation of reasonability of program goals
		The latest evaluation outcome
		Mechanism of revision of existing program goals
		The latest revision
		Roles of industrial and entrepreneurial experts' participation in the revision of program goals
Graduate Attributes	Engineering knowledge	Application of knowledge of mathematics, natural sciences, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
	Problem analysis	Application of fundamentals of mathematics, natural science and engineering science to identify, express and analyze through literature research complex engineering problems to reach substantiated conclusions
	Design/development of solutions	Designing solutions for complex engineering problems and designing systems, components or processes that meet specified needs with appropriate consideration for public health, safety, legal, cultural, societal, and environmental considerations
	Investigation	investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions

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Aspect	Expectation	Indicators
Graduate Attributes	Modern tool usage	Creation, selection and application of appropriate techniques, resources and modern engineering and IT tools, including prediction and modeling, to complex engineering problems, with an understanding of the limitations
	The engineer and society	Applying reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems
	Environment and sustainability	Understanding and evaluating the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts
	Ethics	Application of ethical principles and commit to professional ethics and responsibilities and norms of engineering practice
	Individual and teamwork	Functioning effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings
	Communication	Communicating effectively on complex engineering activities with the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions, *and communicating effectively in a cross-culture setting with global visions*
	Project management and finance	Demonstration of knowledge and understanding of engineering management principles and economic decision-making and applying these in multi-disciplinary environments
	Life-long learning	Recognizing the need for, and being prepared and able to engage in independent and life-long learning in the broadest context of technological change

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Aspect	Expectation	Indicators
Ongoing Improvement	Quality control mechanism for teaching process	Report of quality requirements for all major phases of teaching
		Mechanism of quality control for teaching process and its implementation, including curriculum system, revision of evaluation, formulation and evaluation of syllabus, observation of classroom teaching, assessment methods
		Effectiveness of the quality control mechanism, including the latest outcomes of curricula revision, examination of syllabus, curricula, and realization of learning goals
		Evaluation of graduate students' meeting graduate attributes, including evaluation methods, periods, persons in charge, evaluation standards, and feedback channels;
	Mechanism of tracking graduates' development and societal evaluation	Mechanism of tracking graduates' development and its implementation
		Mechanism of societal evaluation of graduates' quality involving employers, alumni, and other stakeholders of higher education and its implementation
		Operation of tracking graduates' development and multi-agent societal evaluation in the latest three years, including contents, methods and objects, based on which presenting analysis of realization of learning objectives
	Evidence of applying evaluation outcomes to the ongoing improvement of the program	Presentation of the latest evaluation outcomes for educational objectives, graduate attributes realizations, curricula system, and curricula quality and the evidence of how the evaluation outcomes are used for ongoing improvement of the program
Curricula	Curricula support of graduate attributes	Demonstration of how courses set correspond to relevant requirements of graduate attributes
		Formulation and revision of syllabus
		Demonstrations of complete teaching plans and illustration of how prerequisites support following courses
		Credits required to obtain for graduation and guidance to students on course selection

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Aspect	Expectation	Indicators
Curricula	Industrial experts' participation in curricula design	Curricula revision and relevant requirements, including the latest procedures of revising curricula and contents, especially illustrating how industrial experts play their roles in revising the curricula
	Roles of engineering basic courses, program basic courses, and specialized courses in promoting students' professional development	List of three categories of courses with credits for each course: 'engineering basic courses', 'program basic courses', and 'specialized courses'
		Illustrating requirements of taking these courses
		Demonstration of how these different categories of courses facilitate system design capability and foster professional competence
	Engineering praxis and capstone projects (thesis)	Demonstration of praxis education system, including partnership with industries, and businesses; how topic of capstone project attempts to resolve practical engineering problems
		Credits for the compulsory capstone project before students graduate
		Requirements on individual students' experiences of internships at business or enterprises
		Praxis education by students in groups
		Categories of capstone projects in the latest three years
		Establishment of praxis bases jointly established with enterprises
	General courses in humanities	Credits for courses set up
		Requirements of students taking these courses and supporting measures
		Roles of courses in fostering students' comprehension and application of engineering knowledge in economic, environmental, legal and ethical terms.

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Aspect	Expectation	Indicators
Faculty Members	Quantity and structure	Demonstration of reasonableness of full-time faculty members' quantity, professional title structure, age structure, degree structure
		Demonstration of participation of part-time faculty members from industries and enterprises in teaching and other teaching-related work
	Professional competence	Teaching ability and professional level
		Demonstration of faculty members' engineering practices, engineering research, and other teaching-related academic exchanges
		Standards to evaluate individual faculty members' engineering backgrounds and the overall engineering level of the whole faculty
		Demonstration of faculty members' backgrounds and competence meeting complementary standards of teaching
	Time and energy invested in teaching	Regulations and measures to ensure faculty members invest sufficient time in teaching
		Faculty members' time-spending on teaching
		Regulations and measures that encourage faculty members' participation in teaching research and teaching reforms, including actuality and effects
	Support to students	Regulations and measures that require faculty members to provide counseling and instruction to students on their career planning and preparation
		Listing faculty members' all kinds of support to students in addition to classroom teaching
	Faculty responsibility	Regulations and measures that ensure faculty members bear responsibility to provide quality teaching, especially how to promote faculty members to comprehend outcome-based education and fulfill relevant duties
		Demonstration of methods of facilitating and judging faculty members' fulfillment of duties, as well as the accountability system for teaching quality

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Aspect	Expectation	Indicators
Supporting Facilities	Classrooms, labs and equipment	Basic requirements on the provision of classrooms, labs and other equipment
		Mechanism for operation, maintenance and security management of laboratories
		Reality of praxis bases outside campus and their roles
	Computer, network and library resources	Basic requirements on the provision of the resources to ensure the operation of the program
		Regulations and measures of managing and sharing relevant resources
	Educational funding	Regulations, stipulations and standards of educational budget, appropriation and use
	Institutional support of faculty development	Regulations and measures to support faculty members' professional development
		Specific measures to support faculty members' professional development and enhancement of teaching capability in the last three years
		Specific measures to support young faculty members' professional development and engineering practices in the last three years
	Infrastructure for students' completion of education	Infrastructure provided for students' learning and achieving all educational goals, including practical and innovative activities
	institutional management and service	Management and service measures to facilitate students' achieving all kinds of learning goals

IV.6. *Establishing external and internal quality assurance mechanisms*

Since NEE was initiated, China has endeavored to complete a quality assurance mechanism for engineering education with two tracks: external quality assurance and internal quality assurance. There are three-level stakeholders for external quality assurance involving the Chinese Engineering Education Accreditation Association (CEEAA), the Ministry of Education and engineering industries, while higher education institutions are the main subjectivity for the internal quality assurance.

For external quality assurance, firstly, as illustrated previously, CEEAA as the main accreditation authority for engineering programs exerts the most important impact on guiding and assuring the quality for engineering programs. They use a yardstick substantially equivalent to graduate attributes of Washington Accord to measure the performance of individual engineering programs and accredit qualified ones. As such accreditation defines both the reputation and recognition of the program and their providers, and also affects student employment, higher education institutions all place a high value on meeting accreditation standards if they want to attract more funding and more qualified students. Secondly, apart from CEEAA's accreditation, the Ministry of Education (MOE) also evaluates the quality of engineering programs with their own evaluation standards. In the current context of China's continued ambition to develop world-class universities and world-class disciplines (Double World-class),[35] MOE considers CEEAA accreditation results in its evaluation of relevant engineering disciplines, but their measures to evaluate the quality of disciplines, including engineering disciplines are more rigorous.[36] In other words, MOE's evaluation standards are higher than CEEAA's accreditation standards so as to push potential programs to not only meet the bottom line but also race to the top globally. The third stakeholder to for quality assurance of engineering programs is the industry. MOE encourages and supports enterprises' in-depth collaboration with higher education institutions by issuing reports on manpower demand by the market, quality of graduates, providing feedback on praxis education, etc. These reports wield influences on institutions' adjustment of curricula and education schemes by providing timely alarming precaution.

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[35] Double World-class is a plan initiated by Chinese government to develop some Chinese universities to be globally renowned and some academic disciplines to be globally influential in the years to come.

[36] "On Accelerating the Development of NEE and the Implementation of Outstanding Engineers Project," MOE (Ministry of Education) China, accesed July 15, 2018, http://www.moe.gov.cn/srcsite/A08/moe_742/s3860/201810/t20181017_351890.html.

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In terms of internal quality assurance, every higher education institution is required to improve program quality through four aspects: 1) establishing a monitoring mechanism for educational process rather than outcome, namely, setting clear standards and goals for specific educational activities such as course development and assessment method development; 2) tracking program graduates on their employment and career development and also seeking their feedbacks on how engineering programs at school should further improve; 3) establishing a social participation mechanism such as asking an independent professional third-party organization to evaluate how well educational goals are achieved; and 4) providing evidence of actual adoption of evaluation results to ongoing program improvement.[37] While MOE leaves the responsibility of internal quality assurance to higher education institutions themselves, institutions are still required to submit an undergraduate education internal quality assurance report and fill in relevant data to an MOE online data collection platform, and these reports then all go public to be viewed by the society. The quality assurance mechanism in process is displayed in Fig 1.

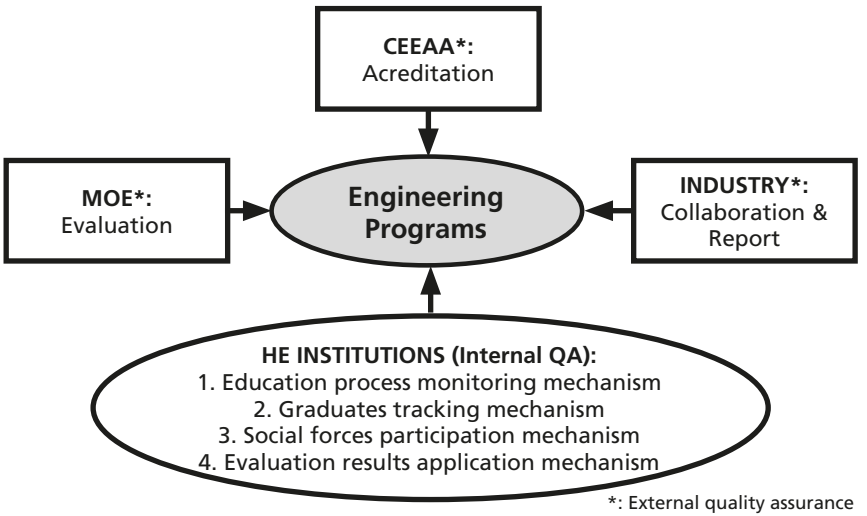

Fig 1

External and Internal Quality Assurance (QA) Mechanism

[37] MOE (Ministry of Education) China. *Annual Quality Report of Engineering Education in China* (2013) (Beijing: Higher Education Evaluation Center of the Ministry of Education, 2014), 69.

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V. **Challenges for China's NEE**

While joining the Washington Accord is a victory step and a new starting point for Chinese engineering education, challenges remain for NEE to achieve its original goals due to the complexity of systematic changes and other barriers constraining core activities of higher education – delivery of high quality teaching and versatile experiential learning.

V.1. *The enlarged uneven resource allocation could hinder the pace towards systematic reform*

According to the three NEE official documents, systematic changes in a broad range of aspects from curricula, praxis platforms, teaching methods, university-industry collaborations and many others are expected to be the ultimate goals of NEE. Systematic changes, however, demand collaboration and synergy of different departments within the system. Borrego and Henderson identified four levels of change that are usable to inform changes in STEM instruction at university level, including disseminating curriculum and pedagogy, developing reflective teachers, enacting policy, and developing shared vision. On each of these four levels, there are more detailed aspects in which practical operations should be conducted, including diffusion, implementation, scholarly teaching, faculty learning communities, quality assurance, organizational development, learning organizations and complexity leadership.[38] Each level and strategy demand different agents to discharge duties in a collaborative and synergetic manner before the fundamental systematic changes can be achieved, and the complexity of the system of engineering education demands strong and effective support from a professional leadership within an institution.

The current higher education system in Chinese mainland, however, is not without constraints in making the systematic changes happen. China's higher education institutions are standing in a hierarchical structure, with those standing at the top always drawing funding and recognition while those standing at the bottom become the disadvantaged.[39] This unevenness has

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[38] Maura Borrego and Charles Henderson. "Theoretical Perspectives on Change in STEM Higher Education and Their Implications for Engineering Education Research and Practice," *Journal of Engineering Education* 103, no. 2 (2014), 224

[39] Ryen M. Allen, "A Comparison of China's 'Ivy League' to Other Peer Groupings through Global University Rankings," *Journal of Studies in International Education* 21, no. 5 (2017):396.

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grown enlarged over the years and contributed to the uneven pace of NEE development across institutions. One example of such resource is the research grant. The amount of grants obtained by top-tier institutions can be 150 times that gained by institutions in the bottom tier. For instance, in 2017, the first-tier Tsinghua University tops the list of total volume of research grants in China, obtaining 1.6 billion RMB (around 250 million US dollars) in total, followed by Shanghai Jiaotong University, Nanjing University and Zhejiang University which also belong to the first tier of universities obtaining approximately 800 million RMB (around 125 million US dollars). Comparatively, the grants gained by third-tier or even lower-tier institutions are astonishingly less compared with the top, with Wuhan Institute of Technology, Hebei Normal University, Shenyang University of Architecture being granted merely 10 million RMB, to name a few (Fig 2).

Money as a type of important resource directly makes a difference in the development of engineering education, determining institutions' relationship with industries, facility set-up, and most importantly, the quality of instructors. As the vastly uneven distribution of resources received by different tiers of institutions signals different governmental expectations, official support as well as social recognition, the current stratification of the higher education institution structure is likely to continue and even enlarged in the future. Such stratification and resource distinction affect institutions' capability to implement international standards on graduate attributes and other aspects in developing NEE. It's projected that there is likely to be a continued quality gap between institutions of different tiers in the process of developing NEE, thus affecting the systematic change of the NEE initiative.

While such a gap is unlikely to be completely filled due to the salient advantaged positions of the top-tier universities, resources have to be mobilized towards a more balanced scenario in which lower-tier universities have access to more resources for the comprehensive improvement of their engineering programs. This requires a policy and focus shift at both state-level and provincial-level governments from 'icing on the cake' to 'sending charcoal in snowy weather'.

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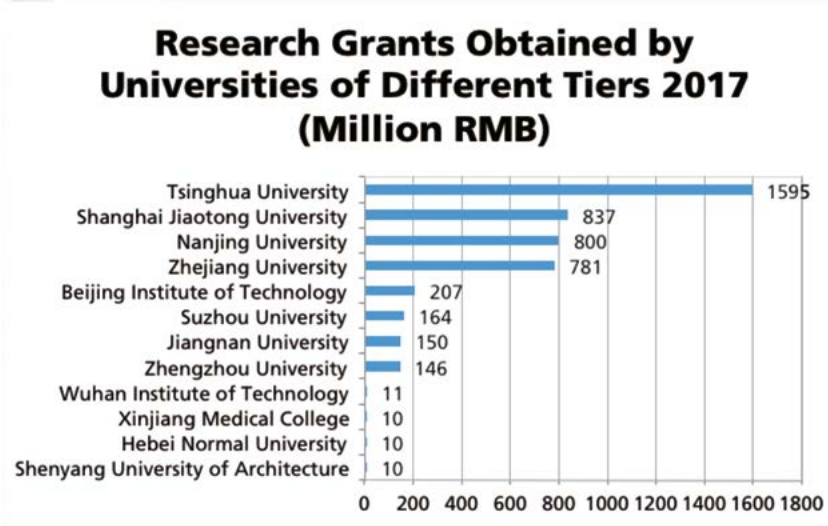

Figure 2

Research Grants obtained by Universities of Different Tiers in 2017
Source: Formulated based upon http://www.polymer.cn/sci/view.aspx?id=13253

V.2. *The core mission 'teaching' downplayed by bureaucratization and over pro-research evaluation system*

No matter how much investment an institution can make in the hardware facilities, there are constant things determining whether students learn and acquire skills effectively. For example, there are important issues as to whether students are learning in an environment where their curiosity and passion for the field are easily ignited, and whether they receive great teaching from highly trained faculty members to form a solid theoretical and applicable foundation. Bureaucratization and the over-pro-research evaluation system, however, are barriers that hinder students from having the best possible educational experiences. Such system constrains individual instructors and departments from working in solidarity towards the realization of NEE goals. Jia and Xiao[40] identified five stakeholders of China's engineering education sector: students,

[40] Guangshi Jia and Chengbin Xiao. "Research on Five Stakeholders and Five Relationships of Higher Engineering Education in China," *L.J. Modern Education and Computer Science 1,* (2009): 63.

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teachers, universities, employers and governments. Among the five, government is the dominant stakeholder possessing the power of resource allocation to different universities. Excessive influences from the government and insufficient effective influences from the employers on higher education institutions have rendered universities to form pro-government policies while downplaying industries' roles. Dominant roles of the government have shaped the internal relationship within an institution as well. Internally, administrative bodies that directly receive governmental funding are also usually in charge of allocating them, thus having more say than academic bodies and individuals, which means that voices from students and instructors are far weaker in promoting a change. Under such a power structure, academic departments more than often prioritize demands from administrative bodies over issues pertaining to the improvement of students' learning.

Besides, the current pro-research evaluation system could also pose a threat to engineering students in receiving the best quality of instruction. For example, many projects instructors undertake required by the promotion system are not related to teaching engineering or engineering education reform. Moreover, the current evaluation system puts instructors under great stress who have no mood to care about how well they teach. Huang, Pang and Yu[41] through analyzing academic identities of instructors working at two Chinese universities known for their engineering programs, categorized Chinese academics into six categories: 1) the managerial advocate, 2) the academic chameleon, 3) the knowledge worker, 4) the stressed faculty, 5) the resolute pilgrim, and 6) the careless outsider. From the six terms the authors chose to use, a competitive and stressful climate where Chinese university instructors are working is revealed. For instance, knowledge workers refer to the junior academic people who feel themselves workers on an academic assembly line and only make efforts to meet the lowest expectations of teaching students. The stressed faculty and the resolute pilgrim believe that the current evaluation system is rather bureaucratic than academic, and they strive a great deal in a system of 'up or go' that caters little to the quality of teaching. As for the careless outsiders, while teaching constitutes the major work of their careers, they are regarded as incompetent by their peers and the system because they are outsiders of the research circle.

The bureaucratization and the over pro-research evaluation system could undermine the ultimate commitment of institutions and instructors to the

[41] Yating Huang, Sun-Keng Pang and Shulin Yu, "Academic Identities and University Faculty Responses to New Managerialist Reforms: Experiences from China," *Studies in Higher Education* 43, no. 1 (2016): 8-16.

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most important aspect of NEE reform, namely improving students' learning experiences and outcomes through well-designed engineering courses and teaching them completely according to international standards such as the Conceive-Design-Implement-Operate approach. For institutions, they may not be sufficiently incentivized to update their curricula, programs and teaching methods by collaborating with the industry. For instructors, they tend to lack the motivation to improve teaching and care about how well students acquire professional knowledge and skills in reality, thus affecting the realization of one of the most important indicators of NEE reform – graduates' attributes.

Bringing about such a transformation will require attitudinal, behavioral, organizational and cultural changes to form a system in which each element carries both individual and collective learning objects for the engineering programs. Among all related factors, it is a crosscutting issue to adjust faculty rewards and incentives as they pertain to teaching and mentoring. Nothing much will happen without these changes. While the 'top-down' approach of government and the administrative bodies within an institution continues to play a role in steering the direction of the NEE at macro level, a 'bottom up' approach that takes full advantage of wisdom and experiences of front-line instructors must also be simultaneously adopted. On the one hand, while the government or administrative bodies should provide necessary resources to universities and their relevant departments, they should by no means intervene too much on the operation of institutions and the programs. On the other hand, the evaluation system must be fixed to shift towards one that casts equal value to teaching and research and encourages instructors to incorporate industrial experiences into course design and implementation.

V.3. *Curriculum reform: easier hoped than done*

Studies have revealed that students' overall satisfaction at universities have been largely determined by their course experience.[42] Students' engagement in academic activities and learning outcomes is highly related to good teaching.[43] While Chinese engineering education sector has realized the importance of developing interdisciplinary courses and praxis courses that

[42] Hongbiao Yin and Wenlan Wang, "Assessing and Improving the Quality of Undergraduate Teaching in China: the Course Experience Questionnaire," *Assessment & Evaluation in Higher Education* 40 no. 8 (2015): 1034.

[43] Eman M. Almarghani and Ivana Mijatovic. "Factors Affecting Student Engagement in HEIs – It Is All About Good Teaching," *Teaching in Higher Education* 22, no.8 (2017): 951.

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mutually support each other in an integrated curriculum system, individual institutions are now in a merely exploratory stage for such course development. How to develop courses that reveal connections of one engineering field with others while not undermining the fundamentals of the field is a salient challenge in curricula reform. As human resources at universities are always limited, it is sort of suspicious as to how many resources can ultimately be input into curricula research and development.

If no changes take place in the curricula system, the efficiency and effectiveness of students' learning outcomes are unlikely to be improved as expected. As in many other countries, China's engineering education removed many hands-on experiences, resulting in students having little concrete experience upon which to base engineering theories. Moreover, lecturing remains a dominant teaching approach in Chinese universities even nowadays.[44] Learning science and cognitive science based on constructivism, however, reveal that people learn from the concrete to the abstract, construct their own knowledge, test concepts on prior experience, apply these concepts to new situations, and integrate the new concepts into prior knowledge.[45] Therefore, the lack of practical experiences and an environment of experiential learning affect students' digestions of engineering theories and hamper their ability to realize the practical usefulness of engineering theories. This demotivates learning and results in low retention in the engineering sector for further study or for employment. While there has been a common sense of urgency to reform the curriculum system, the change of the status quo of curricula structure and teaching methods and institutionalizing evidence-based approaches still take time to accomplish.

VI. **Discussion**

Launching educational reforms demands a visionary all-of-the-above design and a variety of pragmatic conditions and support. The overall progress of Chinese higher education over the past two decades and the size growth of the engineering education sector has created mature conditions in which NEE is likely to develop supported by sufficient resources such as

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[44] Hongbiao Yin and Genshu Lu. "Development and Validation of an Instrument for Assessing Mathematics Classroom Environment in Tertiary Institutions," *Asia-Pacific Educational Researcher* 23. no. 3, (2014): 665.

[45] Edward F. Crawley, John Malmqvist, Sören Östlund, Doris Brodeur. and Edström Kristina, *Rethinking Engineering Education: The CDIO Approach* (Singapore: Springer, 2007), 24.

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infrastructure, hardware, and funds. Generally speaking, investment in engineering education is not a problem either as a consensus or as an actual action by various stakeholders. Of prominence are the development path and the quality of manpower underpinning the reform.

China's upholding the international standards to develop NEE and make structural adjustments is a salient feature in the history of its engineering education sector. The most important embodiment of upholding international standards is reflected in the framework guiding accreditation of engineering programs which draws heavily on international practices such as the Washington Accord and considers Chinese realities. Covering seven aspects of student, program goals, graduate attributes, ongoing improvement, curricula, faculty members, and supporting facilities, the framework reveals China's determination to rebuild its engineering education in a comprehensive manner to one that focus more on students and cater more to industrial demands as many developed nations do.

Creating new and upgrading existing programs on an extensive scale are both ambitious and bold endeavors for China to make, which involve a tremendous amount of cost and cross-departmental synergy. With aforementioned challenges properly addressed, it's likely that China's engineering education system is to become more efficient to ensure the match between graduate attributes and industrial demands. Despite the possible pace gap between top universities and those in lower tiers in developing NEE towards desired goals due to vast distinction in resource allocation, China can still be expected to become a leading nation in terms of cultivating graduates in emerging programs such as artificial intelligence, in that the current prevalent establishment of new programs among hundreds of higher education institutions is likely to sift certain reform patterns and models that prove successful and replicable. Outcomes of NEE are supposed to be scrutinized in around 2022, the time point of graduation of the first session of undergraduate students who began their study right after the framework of the Guidance on Engineering Education Accreditation Self-assessment was released in Nov 2017.

VII. **Conclusion**

This paper takes China as an example to illustrate a developing nation's aspirations and endeavors to advance from periphery towards center in the global higher engineering education landscape. Along with such an educational dream, NEE has also been initiated with a pragmatic purpose of

producing quality engineering talents to underpin the country's technological advancement and long-term economic development. Despite the distinction of Chinese society, culture and politics from those of the West and China's intention to keep such unique features of its own, in terms of engineering education, China does value international standards (represented by Western standards) a great deal, and such valuing is reflected in the formulation of its own accreditation schemes that fully incorporate international standards such as the Washington Accord. Since 2017, China has taken various actions to develop NEE, including formulation of National Standards for many categories of programs, commissioning hundreds of research projects on NEE development, establishment of new engineering programs and interdisciplinary courses, strengthening university-industry partnerships, accrediting engineering programs, and improving both external and internal quality assurance mechanisms. Challenges, however, remain to be addressed. A more even resource allocation mechanism must be worked for to ensure higher education institutions of various tiers all have necessary resources to reform engineering programs. More importantly, the fundamental mission of teaching must be re-valued by adjusting the current evaluation system to be a more pro-teaching one and addressing the issue of bureaucratization. And finally, upgrading the curricula system by issuing policies and mechanism to increase practical experiences of instructors, build a culture of experiential learning and effectively enhancing interdisciplinary features of courses are essential in the production of quality graduates. In a nutshell, China has established structural mechanisms to ensure the quality of its engineering education development, and the key to success lies in getting rid of visible and invisible barriers in the implementation of such mechanisms.

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Combining course- and program-level outcomes assessments through embedded performance assessments at key courses: A proposal based on the experience from a Japanese dental education program

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Abstract: This paper addresses how to combine the course- and program-level assessments and presents a new method illustrated by a case of dental education program in Japan. Performance assessments are considered effective for evaluating knowledge integration and higher-order skills, while placing a burden on faculty, hence their feasibility as the program-level assessment is regarded lower than standardized tests or questionnaire surveys. We have developed several performance assessments at the course level, such as Modified Triple Jump for the PBL course. Based on this experience, we propose Pivotal Embedded Performance Assessment (PEPA) as a method for combining assessment at the course and program levels. The method limits the range of performance assessment to key courses directly linked to program goals and placed at the critical juncture points of curriculum, while entrusting the assessment of other courses to expert judgment of individual teachers.

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PEPA consists of the following procedures: systematization of curriculum and selection of key courses; design and implementation of performance assessments by a faculty team; setting passing criteria with incorporating the function of formative assessment; certifying the completion of the degree program. PEPA thus enables maintaining assessment feasibility and compatibility with a credit system, while ensuring assessment validity and reliability.

Keywords: Performance Assessment; Embedded Assessment; Program-Level Assessment; Curriculum; PBL (Problem-Based Learning); Dental Education.

I. **Problem and Purpose**

I.1. *Diversity of learning outcomes assessments*

The question of how to assess learning outcomes is currently an important issue in higher education across many countries.

The variety of learning outcomes assessments has been increasing in recent years and can be classified into (1) direct and indirect assessment, (2) qualitative and quantitative assessment, and (3) assessment at the course/program/institution level.[1] Of these, the difference between direct and indirect assessment is whether the assessment method is based on direct or indirect evidence. For example, students can demonstrate their knowledge and skills either directly (through what they really know and can do), which constitutes a direct assessment, or indirectly via a self-report (through what they think they know and can do), which constitutes an indirect assessment.[2]

Classifying along these axes makes it easy to grasp the characteristics of assessment methods. For example, K. Matsushita[3] used the intersection of (1) and (2) to elucidate the characteristic features of four types of learning outcomes assessments (Figure 1).

Also, Middle States Commission on Higher Education,[4] one of American accreditation associations, employed the intersection of (1) and (3) to

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[1] Kayo Matsushita, "Making Learning Outcomes Visible," *Japanese Journal of Higher Education Research* 20 (2017): 94-96 [in Japanese].

[2] Trudy W. Banta and Catherine A. Palomba. *Assessment Essentials: Planning, Implementing, and Improving Assessment in Higher Education,* 2nd ed. (San Francisco: Jossey-Bass, 2015), 93-144.

[3] Matsushita, "Making Learning Outcomes Visible," 102.

[4] Middle States Commission on Higher Education, *Student Learning Assessment: Options and Resources*. 2nd ed. (2007), 29, https://www.msche.org/publications/SLA_Book_0808080728085320.pdf.

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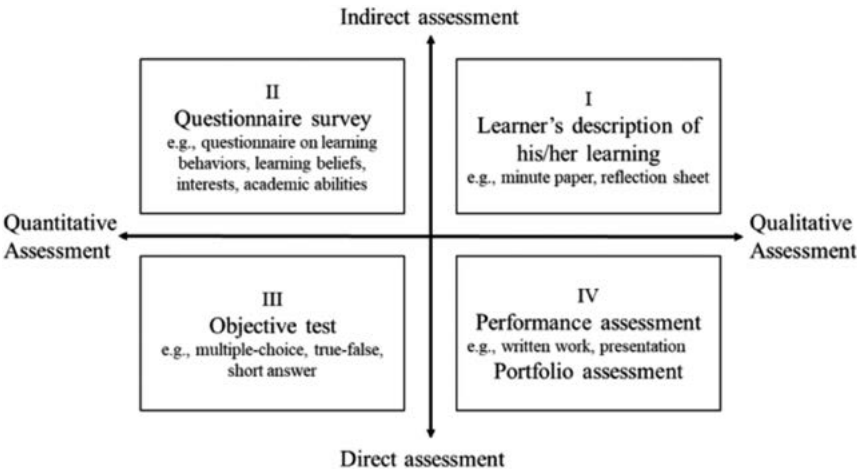

Figure 1
Four Types of Learning Outcomes Assessment

categorize assessments according to direct vs. indirect measures and institution-, program- and course-level assessments.

Use and integration of such a variety of assessment methods for different purposes allows for a multifaceted understanding of student learning, which connects with educational improvements. This approach is increasingly being adopted by universities across different countries.

I.2. *The assessment gap between course, program and institution levels*

However, looking closely at the assessment methods that are actually being used, large differences between countries become apparent. For example, the assessment of student learning outcomes at the institution level in the U.S. mostly utilizes three tools, namely national student surveys (85%), rubrics (69%) and classroom-based performance assessments (66%), which are regarded as "most valuable or important" approaches for assessing undergraduate student learning outcomes.[5] On the other hand, in Japan it is

[5] George D. Kuh et al., *Knowing What Students Know and Can Do: The Current State of Student Learning Outcomes Assessment in U.S. Colleges and Universities* (Champaign: National Institute for Learning Outcomes Assessment, 2014), 12-13, http://www.learningoutcomeassessment.org/documents/ 2013%20Abridged%20Survey%20Report%20Final.pdf.

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standardized tests (32.2%), questionnaire surveys (20.2%), learning portfolios (12.7%), and rubrics (6.8%) that are used as "assessment methods of student learning outcomes at a program level."[6] With the growing demands on assessment at program and institution levels in recent years, standardized tests (type III in Figure 1) and questionnaire surveys (type II) have been increasingly employed. However, the utilization of learning portfolios and rubrics (type IV) at program and institution levels remains limited to some universities.

Why are the qualitative and direct assessment methods (type IV) not used more often for program- and institution-level assessments in Japan? Certainly, at the course level there are many kinds of performance measures in use in Japan, including products (e.g., essays, art works) and demonstrations (e.g., oral presentations, simulations), but they are not connected with program- and institution-level assessments due to the lack of knowledge and skills as well as human and time resources.

In contrast, the criticism of standardized tests in the U.S. led the Association of American Colleges and Universities (AAC&U) to develop Valid Assessment of Learning in Undergraduate Education (VALUE) rubrics,[7] which increased the share of program- and institution-level via classroom-based performance assessments and rubrics.[8] According to T. W. Banta and C. A. Palomba, "The [VALUE] rubrics were developed to help link the assessment work done by faculty in individual classrooms to the assessment work that is often done separately by faculty and evaluators at the program or institution level"[9] and they are considered to fulfil these functions in practice.

Nonetheless, even in the U.S. the question of how to implement assessments at the program and institution level remains problematic. Based on the survey results of assessment practices at the program level, P. Ewell, K. Paulson, and J. Kinzie find that locally developed assessments at universities, such as capstone courses and rubrics, are used more often than standardized tests, although a great deal of variation exists across disciplines.[10]

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[6] Ministry of Education, Culture, Sports, Science and Technology, "Japanese University Reforms Including Those in Educational Contents," (November, 2017), 22, http://www.mext.go.jp/a_menu/koutou/daigaku/04052801/__icsFiles/ afieldfile/2017/12/13/1398426_1.pdf [in Japanese.].

[7] Terrel Rhodes, *Assessing Outcomes and Improving Achievement: Tips and Tools for Using the Rubrics* (Washington D.C.: Association of American Colleges and Universities, 2009).

[8] Kuh et al., *Knowing What Students Know*, 33.

[9] Banta and Palomba, *Assessment Essentials*, 101.

[10] Peter Ewell, Karen Paulson, and Jillian Kinzie. *Down and In: Assessment Practices at the Program Level*. (Champaign: National Institute for Learning Outcomes Assessment, 2014),

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I.3. *Purpose and outline*

Our purpose in this paper is to introduce the state of learning outcomes assessment in Japan, to discuss the current assessment research regarding how to connect the course- and program-level assessments, and to present a concrete proposal based on the experience from the Faculty of Dentistry at Niigata University, Japan.

Niigata University is one of Japan's 86 national universities and its Faculty of Dentistry is known for being at the forefront of dental education. In our paper, we present some of the results of practical research related to assessment and curriculum that stems from the collaboration between a faculty member from the Faculty of Dentistry at Niigata University and specialists in higher education assessment over the past few years.

We describe performance assessment in a course Problem-Based Learning (PBL), one of the key courses in Niigata University's dental education program, as an example of assessment at the course level. There have been various approaches related to PBL assessment,[11] but we will here propose a new method of performance assessment of PBL called "Modified Triple Jump (MTJ)." We will also focus on several key courses besides the PBL course and illustrate how their performance assessments in fact connect with program-level assessment.

Course assessments that do double duty, providing information not only on what students have learned in the course but also on their progress in achieving program or institutional goals are called "embedded assessment."[12] Using this concept in this paper, we will investigate how to realize program-level assessment by arranging and integrating several course-embedded performance assessments. These practical findings form the basis of the

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http://www.learningoutcomeassessment.org/documents/ NILOAsurveyreport2011%20-%20Down%20and%20In%2010-20.pdf.

[11] Ntombifikile G. Mtshali and Lyn Middleton, "The Triple Jump Assessment: Aligning Learning and Assessment," in *New Approaches to Problem-Based Learning: Revitalising Your Practice in Higher Education,* eds. Terry Barrett and Sarah Moore (New York: Routledge, 2011), 187-200; Tracy Winning, Elaine Lim, and Grant Townsend, "Student Experiences of Assessment in Two Problem-Based Dental Curricula: Adelaide and Dublin," *Assessment & Evaluation in Higher Education* 30, no. 5 (2005): 489-505.

[12] Linda Suskie, *Assessing Student Learning: A Common Sense Guide,* 2nd ed. (San Francisco: Jossey-Bass, 2009), chap. 2, Kindle; Rhoda Cummings, Cleborne D. Maddux, and Aaron Richmond, "Curriculum-Embedded Performance Assessment in Higher Education: Maximum Efficiency and Minimum Disruption," *Assessment & Evaluation in Higher Education* 33, no. 6 (2008): 599-605.

discussion, through which we intend to contribute to the development of international assessment research.

According to T. W. Banta and C. A. Palomba, the practical use of performance measures in program-level assessment can be largely categorized into two methods.[13] The first one selects samples of courses from the program, then selects samples of student work in the chosen courses, and finally the faculty team conducts a second scoring for the purpose of program assessment. The second method directly aggregates assessment results of each course by each teacher for the purpose of program assessment. They introduce, as one typical example, the so-called All-in-One approach developed at Prince George's Community College, which uses digital technology in order to integrate assessment of course, program, and general education outcomes and connect outcomes assessment with classroom grading.[14]

The first method is used in many American universities, but it imposes a great assessment burden on faculty members, hence the assessment feasibility is considered to be low. In contrast, the second method seems to be more efficient and promising, but since there are only few cases, it is considered to be in its trial stage. The Faculty of Dentistry at Niigata University utilizes the second method; however, it differs from the All-in-One approach and is quite innovative.

Below we will first introduce the MTJ, which represents a new performance assessment method for PBL courses. Then we will discuss the alignment between curriculum and assessment, which underpins assessment at the course and program levels. Based on that, we will propose a method of integrating course-level and program-level assessments, and after comparing various program-level assessments we will finally demonstrate the effectiveness of our postulated method – Pivotal Embedded Performance Assessment.

II. **PBL as a key course and its performance assessment**

II.1. *PBL at the Faculty of Dentistry at Niigata University*

The Faculty of Dentistry at Niigata University consists of two departments: the Department of Dentistry and the Department of Oral Health and Welfare.

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[13] Banta and Palomba, *Assessment Essentials*, 104-5.

[14] W. Allen Richman and Laura Ariovich, *All-in-One: Combining Grading, Course, Program, and General Education Outcomes Assessment* (Champaign: National Institute for Learning Outcomes Assessment, 2013), http:// learningoutcomesassessment.org/documents/Occasional%20Paper%2019%20FINAL.pdf.

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Study at the Dentistry department requires six years, whereas the Oral Health and Welfare takes four years, and the class size is 40 and 20 students, respectively. The Dentistry department formulates its educational goals as "nurturing skills for solving various current problems in the rapidly changing modern society while properly collaborating with persons concerned, as well as providing high dental clinical competences for practicing holistic medicine." In order to realize these goals both departments actively adopt PBL from early stages. Furthermore, several key courses, directly linked with these educational goals, implement performance assessments with rubrics.

PBL at the Faculty of Dentistry at Niigata University is based on the model developed by the Faculty of Odontology at Malmö University in Sweden.[15] In this model, students form groups of seven to eight with teachers as facilitators and PBL is conducted in the following steps.[16]

1st step: Group learning in the classroom

(1) First, students identify the facts from the case written in a form of scenario.
(2) They discuss questions and ideas related to these facts and make solution strategies (hypotheses) linked to the problems included in the scenario.
(3) Next, students confirm what kind of knowledge they lack in order to examine their own hypotheses and they set their learning tasks.

2nd step: Individual learning outside the classroom

(4) Outside the classroom, students then individually conduct investigations related to the learning tasks.

3rd step: Group learning in the classroom (one week later)

(5) One week later, the student groups combine the individual findings and integrate their pre-existing knowledge with their new knowledge, which was acquired through investigations.
(6) Students examine whether their originally proposed solution strategies (hypotheses) are valid or not, and create their final version of the solution strategies.

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[15] Madeleine Rohlin, Kerstin Petersson, and Gunnel Svensäter, "The Malmö Model: A Problem-Based Learning Curriculum in Undergraduate Dental Education," *European Journal of Dental Education* 2 (1998): 103-114.

[16] Kazuhiro Ono and Kayo Matsushita, "PBL Tutorial Linking Classroom to Practice: Focusing on Assessment as Learning," in *Deep Active Learning: Toward Greater Depth in University Education,* ed. Kayo Matsushita (Singapore: Springer, 2017), 185-86.

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PBL's effects are listed as follows: acquisition of a body of integrated deep knowledge and understanding, fostering the ability to analyze and solve problems, cultivation of interpersonal skills and nurturing a desire to continually learn.[17]

II.2. *Development of performance assessment method for PBL: Modified Triple Jump*

In order to assess the problem-solving skills that students acquired through PBL, we developed the Modified Triple Jump (MTJ). The Triple Jump as a method for the assessment of problem-solving and self-directed learning skills in PBL was designed in 1975 by the Department of Medicine at McMaster University in Canada.[18] A student and a teacher conduct PBL one on one, similarly to the learning process of regular PBL comprising of three steps, replacing the usual student group learning in the 1st and 3rd steps with a teacher-student interaction, thereby assessing the student. In order to examine their solution strategy, the student visits libraries, for example, in the 2nd step, collects reliable information, and engages in individual learning. Afterwards, in the 3rd step, the student returns to the classroom, integrates the knowledge obtained with the pre-existing knowledge, and explains his/her final version of solution strategy to the teacher.

Assessment progresses through the same process as the regular PBL, so that assessment validity, in particular, face validity is considered high. Moreover, scenarios are created and examined through cooperation of various experts, so that the content validity is deemed to be maintained. On the other hand, the assessment reliability is generally considered to be low for the following reasons: it is subjective; there is no assessor who can observe the interaction between a teacher and a student; the teacher could miss the student's verbal explanations; the assessment results are easily influenced by the quality of the material (case) used for assessment, student personality, as well as the level of assessor's proficiency.[19] As for assessment feasibility, it has been pointed out that triple jump not only requires time for

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[17] Howard S. Barrows, "The Essentials of Problem-Based Learning," *Journal of Dental Education* 62 (1998): 630.

[18] Jennifer M. Blake, Geoffrey R. Norman, and E. Kinsey M. Smith, "Report Card from McMaster: Student Evaluation at a Problem-Based Medical School," *The Lancet* 345 (1995): 899-902.

[19] Mtshali and Middleton, "The Triple Jump Assessment," 199.

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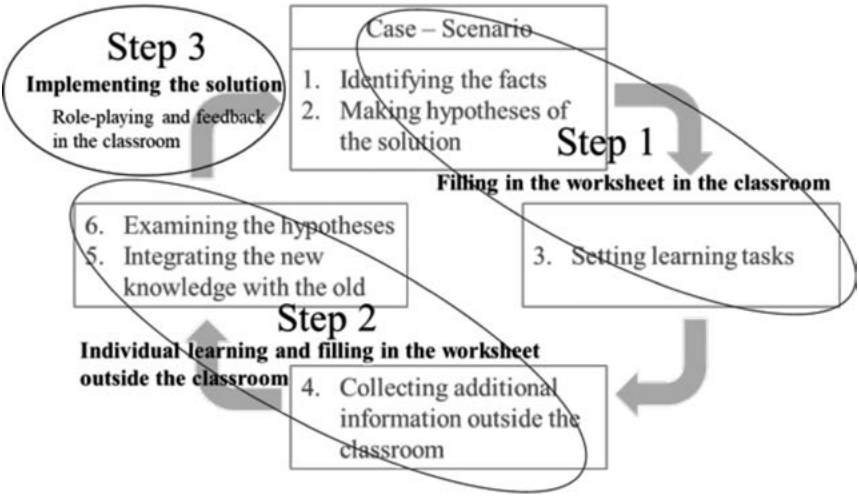

Figure 2
Process and Steps of the Modified Triple Jump (Ono and Matsushita 2017, 194)

learning, but also that assessment is time-intensive and thus places a burden on teachers.[20] As a result, there are few universities that currently conduct triple jump as an assessment method of PBL. However, since there is no other assessment method that could replace triple jump and at the same time fulfil the criteria of validity, reliability and feasibility, our study aims to improve upon triple jump.

The whole process of our MTJ is depicted in Figure 2. In step 1, like the original triple jump, a student identifies problems, proposes hypothetical solution strategies and sets learning tasks, but, unlike the original triple jump, he/she also describes the process on a worksheet, all within a 60-minute time limit. In step 2, the student not only investigates learning tasks, but also based on the findings he/she also examines the solution strategies and within a week formulates a final version of solution strategy, while recording the process on a worksheet. That is to say, MTJ can be largely characterized by reducing the original triple jump to steps 1 and 2, replacing verbal assessment with written assessment, and also by employing rubrics for the purpose of assessment. In addition, step 3 of MTJ is newly

[20] Mark J. Newman, "Problem Based Learning: An Introduction and Overview of the Key Features of the Approach," *Journal of Veterinary Medical Education* 32 (2005): 17.

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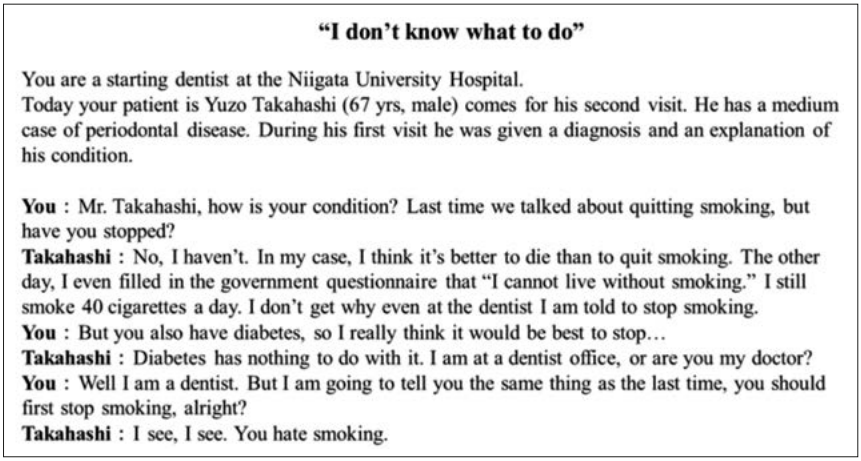
designed and added, where the student is assessed through role play with the teacher as a simulated patient acting out scenario situations, and the assessment is continuously conducted all the way until the implementation of solution strategy when another rubric is adopted. Immediately after the role play in step 3, feedback on assessment results is provided for the total duration of 15 minutes.[21]

Let's be more specific. For example, in MTJ within the course titled "Link between oral cavity and the body" a student, assigned the scenario shown in Figure 3, conducts written tasks based on the worksheet (steps 1 & 2) and a demonstration task based on the role play (step 3), while teachers conduct assessment according to two different rubrics. The rubric for the worksheet in steps 1 & 2 (Table 1) comprises of six dimensions from "identifying a problem" to "proposing a solution" that are assessed on a four-level scale. The seventh dimension called "implementing a solution" is assessed in step 3, where the rubric (Table 2) contains four sub-dimensions such as "sympathetic attitudes." We showed the rubric for steps 1 and 2 to the students before they tackled the task; however, we didn't show them the one for step 3 because it is a task-specific rubric.



"I don't know what to do"

You are a starting dentist at the Niigata University Hospital.
Today your patient is Yuzo Takahashi (67 yrs, male) comes for his second visit. He has a medium case of periodontal disease. During his first visit he was given a diagnosis and an explanation of his condition.

You : Mr. Takahashi, how is your condition? Last time we talked about quitting smoking, but have you stopped?
Takahashi : No, I haven't. In my case, I think it's better to die than to quit smoking. The other day, I even filled in the government questionnaire that "I cannot live without smoking." I still smoke 40 cigarettes a day. I don't get why even at the dentist I am told to stop smoking.
You : But you also have diabetes, so I really think it would be best to stop…
Takahashi : Diabetes has nothing to do with it. I am at a dentist office, or are you my doctor?
You : Well I am a dentist. But I am going to tell you the same thing as the last time, you should first stop smoking, alright?
Takahashi : I see, I see. You hate smoking.

Figure 3
Scenario Example of a Modified Triple Jump

[21] Ono and Matsushita, "PBL Tutorial," 193-94.

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Table 1

Rubric for Steps 1 and 2 of the Modified Triple Jump (partial excerpt)

Dimensions	**1. Identifying a problem**	**2. Conceiving solution strategies**	**3. Setting learning tasks**	**4. Learning results and resources**	**5. Examining solution strategies**	**6. Proposing a solution**
Explanation of dimensions	Identifies the problem based on the facts of the scenario.	Determines the objective of the solution and proposes a number of solution strategies.	Sets out the necessary learning tasks to solve the problem.	Learning tasks undertaken using credible resources.	Considers the effectiveness and feasibility of the solution strategies.	Proposes a solution to the problem.
Level 3	…	…	…	…	…	…
Level 2	Identifies and explains the problem based on the facts of the scenario.	Proposes a number of solution strategies and explains the process by which they were developed.	Identifies learning tasks and explains their necessity from their relation to the proposed solution strategies, but misses some key learning tasks.	Selects resources based on their credibility and generally obtains correct information.	Compares a number of solution strategies with regard to the effectiveness and feasibility of each.	Proposes a reasonable solution appropriate for the scenario situation.
Level 1	…	…	…	…	…	…
Level 0	Students not satisfying the Level 1 criterion shall be given a zero.					

Note: The descriptors of levels 3 & 1 are omitted here.

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Table 2

Rubric for Step 3 of the Modified Triple Jump (partial excerpt)

Dimensions	**7. Implementing a solution**			
	7-1. Gathering additional information (gathering additional information and reformulating the problem)	7-2. Integration of information (integration of additional information and correction of the preexisting solution)	7-3. Sympathetic attitudes (sympathy for a partner)	7-4. Communication (expressing the solution in the way that partner can grasp)
Explanation of dimensions	To persuade the patient to stop smoking, the student gathers additional information through a conversation with the patient and, if necessary, reformulates the problem.	To persuade the patient to stop smoking, the student integrates useful information with additional information and, if necessary, modifies the proposed solution.	The student urges the patient to stop smoking while respecting patient's thinking and values.	The student explains his or her thinking to the patient in simple terms.
Level 3	…	…	…	…
Level 2	The student gathers some of the required additional information, such as patient's needs of periodontal treatment, investigates patient's claim "I cannot live without smoking," and collects information about diabetes and other ailments.	Upon integrating the additional information from the patient, the student achieves an adequate understanding of the importance of quitting smoking for periodontal treatment, not only due to the link between periodontal disease and smoking, but also due to the link between periodontal disease and diabetes.	After acknowledging patient's claim "I cannot live without smoking," the student urges the patient to stop smoking while paying attention to patient's feelings.	The student largely considers the topics and their organization, achieves patient's understanding, but there are some problems regarding the structure of the communication toward the patient.
Level 1	…	…	…	…
Level 0	Students not satisfying the Level 1 criterion shall be given a zero.			

Note: The rubric for step 3 of the Modified Triple Jump is task-specific, hence its descriptors depend on the scenario content. Here we display the rubric of step 3 for the scenario shown in Figure 3. The descriptors of levels 3 & 1 are omitted here.

The results of implementing PBL courses in the Oral Health and Welfare department over the past five years have revealed the following advantages of MTJ when compared with the original triple jump. First, in regard to assessment reliability, the assessment conducted by three teachers utilizing rubrics in steps 1 & 2 and step 3, respectively, showed an overall high level of absolute agreement between the assessors in each dimension, indicating a sufficient level inter-rater reliability (average ICC(2,3) = .76).[22] As for the assessment feasibility, due to the introduction of worksheets in steps 1 & 2, many students could take the examination simultaneously, thereby considerably reducing the time demands on teachers for face-to-face assessment tied to the assessment setting. In addition, the results of student free-answer questions in the aftermath of MTJ implementation showed numerous positive responses, such as "In order to gain understanding of the disease from the simulated patient, I closely examined the disease and deepened my own understanding," "Through conducting step 3, I could understand how PBL can become helpful in my future workplace," so that the assessment was not merely an "assessment of learning" but it itself became a learning experience for students, or "assessment as learning."[23] Based on the above, we can assert that MTJ is a well-designed assessment method for PBL.

III. **Alignment of assessment with curriculum**

III.1. *Outline of the curriculum and assessment*

The educational goals of the Faculty of Dentistry at Niigata University stated earlier can be further divided into 24 items: seven items within "knowledge & understanding," six items within "specialized skills (subject-specific skills)," eight items within "generic skills," and three items within "attitudes and values." These are the *intended learning outcomes*[24] of the dental education program.

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[22] Kazuhiro Ono, Kayo Matsushita, and Yugo Saito, "Prospects for Direct Assessment of Problem Solving Competence: Development of Modified Triple Jump in Problem-Based Learning," *Journal of the Liberal and General Education Society of Japan* 36, no. 1 (2014): 128-29 [in Japanese].

[23] Alverno College Faculty, *Student Assessment-as-Learning at Alverno College* (Milwaukee: Alverno College Institute, 1994); Lorna M. Earl, *Assessment as Learning: Using Classroom Assessment to Maximize Student Learning* (Thousand Oaks: Corwin Press, 2003); Ono and Matsushita, "PBL Tutorial," 183-84.

[24] John Biggs and Catherine Tang, *Teaching for Quality Learning at University,* 4th ed. (Berkshire: The Society for Research into Higher Education & Open University Press, 2011), chap. 7, Kindle.

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At institution level, Niigata University aims to equip "skills for identifying and solving problem," "ability to learn independently knowledge and skills necessary for solving problems," and "communication skills for collaborative tackling of problems" to all of its graduates. These goals are included in all individual educational programs, and the intended learning outcomes are therefore subdivided into the categories of "knowledge & understanding," "specialized skills (subject-specific skills)," "generic skills," and "attitudes and values." The intended learning outcomes of the dental education program are established in accordance with the institutional diploma policy, but they are also consistent with the "core" that must be followed by all dental universities in Japan, namely "the basic qualities and abilities required of a dentist" listed in Model Core Curriculum for Dental Education.[25] In other words, the intended learning outcomes of the Faculty of Dentistry at Niigata University are on the one hand institutional goals, and on the other hand they transcend the institution, as they have been designed in accordance with the field goals on a national level.

In order for the students to acquire such qualities and abilities, we link the intended learning outcomes with each course on the curriculum map, and compose the dental education program containing general education (Figure 4). As shown in this curriculum tree, the program takes six years, and based on its learning content it can be largely divided into four stages: 1st school year to early 2nd school year, late 2nd school year to 3rd school year, 4th school year to early 5th school year, and late 5th school year to 6th school year. Also, courses are classified into the following eight groups: liberal arts, English, study/research skills, basic oral science, clinical dentistry, integration of knowledge and skills, professionalism, and international activities.

The first stage emphasizes "transformation to autonomous learning and studying liberal arts." In the course "University study skills" we attempt to transform learning attitudes of freshmen, cultivate problem-solving skills and ability to think logically and communicate effectively necessary for completing the coming dental education program, and assess the learning outcomes through performance assessment.

The second stage focuses on "study of basic oral science and gaining self-awareness as a dentist," during which basic oral science courses are basically delivered in a lecture-style format for knowledge acquisition, while the awareness and attitudes as a medical professional are cultivated through patient

[25] Model Core Curriculum Revision Coordination Committee and Model Core Curriculum Revision Specialist Research Committee. *Model Core Curriculum for Dental Education: AY 2016 Revision* (2017), http://www.mext.go.jp/component/ b_menu/shingi/toushin/__icsFiles/ afieldfile/2017/07/07/1383961_02_3.pdf [in Japanese].

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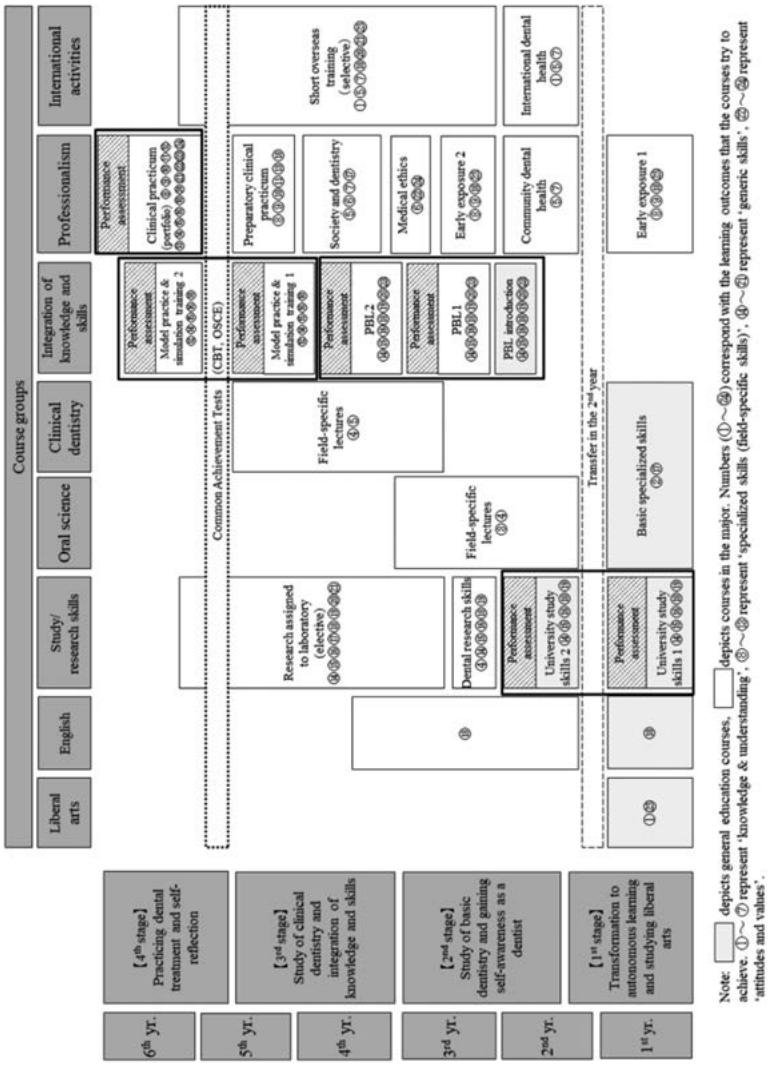

Figure 4
Outline of the Curriculum and Assessment

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contact in the "Early exposure" courses. Moreover, in order to integrate the knowledge gained from lectures and foster problem-solving skills, PBL is implemented in parallel with related lectures, and its learning outcomes are assessed through performance assessment, that is, the above described MTJ.

The third stage concentrates on "study of clinical dentistry and integration of knowledge and skills," during which clinical dentistry courses are largely delivered in a lecture-style format. At the same time, PBL from the second stage is continued, and "Model practice & simulation training" is newly implemented, thereby integrating knowledge with skills, including those of basic oral science, as well as fostering problem-solving skills that are highly specialized. Hence, these learning outcomes are assessed by means of a different type of performance assessment.

The fourth stage is dedicated to "practicing dental treatment and self-reflection." First, the Common Achievement Tests Organization (CATO) administers Common Achievement Tests for Dental Students Prior to Clinical Clerkship, assessing whether the qualities and abilities for conducting clinical training are acquired through Computer-Based Testing (CBT) for knowledge and Objective Structured Clinical Examination (OSCE) for skills and attitudes. Upon passing these tests, students are admitted to join "Clinical practicum," where they improve dental clinical competences through their experience with patient care. The assessment of dental clinical competences is conducted via e-portfolio continuously and formatively, whereas performance assessments are carried out as the direct assessment of patient care at the end of "Clinical practicum."

III.2. *Performance assessments at key courses*

Within this curriculum the following courses are placed as key courses in each stage: "University study skills" as a general education course; "PBL," "Model practice & simulation training," and "Clinical practicum" as courses in the major at the Faculty of Dentistry (Figure 4). Based on the integration of previously acquired knowledge and skills, these key courses require generic problem solving skills as well as subject-specific problem solving skills, both of which are departmental educational goals as mentioned above. The items under "Problem solving skills" in Table 3 represent each dimension of AAC&U's problem solving VALUE rubric,[26] while "Dental clinical competences" represent problem solving skills in the field of dentistry.

[26] Rhodes, *Assessing Outcomes*, 40-41.

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Table 3

Fostering and Assessing Subject-specific Problem Solving Skills in a Dental Education Program

Problem solving skills	Dental clinical skills	University study skills (no patient)	PBL (paper patient/ simulated patient)	Model practice & simulation training (model)	Clinical practicum (real patient)
Define problem	Information gathering & analysis	√	√	√	√
	Diagnosis	√	√	√	√
Identify strategies	Determining treatment policy	√	√	√	√
Propose solutions/ hypotheses	Designing treatment plan	√	√	√	√
Evaluate potential solutions		√	√	√	√
Implement solution	Implementing treatment		Step 3 of the Modified Triple Jump	√	√
Evaluate outcomes	Evaluating treatment results and revising treatment plan		Step 3 of the Modified Triple Jump	Comments/ feedback from a teacher	√

Degree of specificity, comprehensiveness and authenticity

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Progressing from "University study skills" (1st stage) to "PBL" (2nd stage), "Model practice & simulation training" (3rd stage), and then to "Clinical practicum" (4th stage), problem solving skills become increasingly specialized, including an increasing number of problem solving dimensions, becoming ever more comprehensive. Moving from problem solving on paper to real patients in clinical situations thus raises the authenticity.

Discussed below are the different kinds of performance assessments that are implemented within the key courses. The dimensions of all the rubrics are shown in Table 4.

Table 4

Quality Assurance of Graduates Through Embedded Performance Assessment

	Dimensions	Level 3	Level 2	Level 1	Level 0
Problem-solving/dental clinical skills (Freshmen)	**University study skills 1 & 2**				
	Background and problems		2	1	
	Claims and conclusions		2	1	
	Warrant and facts/data	2	1		
	Examination of rebuttals		2	1	
	Overall structure		2	1	
	Rules of expression	2		1	
	PBL 1 & 2				
	Identifying a problem		2	1	
	Conceiving solution strategies		2	1	
	Setting learning tasks		2	1	
	Learning results and resources	2	1		
	Examining solution strategies		2	1	
	Proposing a solution		2	1	
	Implementing a solution		2	1	
	Model practice & simulation training 1 & 2				
	Pathosis and diagnosis	2	1		
	Setting of treatment policy		2	1	
	Treatment plan		2	1	
	Reflection after the treatment		2	1	
	Technical terms and expressions	2	1		

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Dimensions		Well done	Accept-able	Unac-ceptable	
(Seniors)	**Clinical practicum**				
	Interviewing and gathering information		■		
	Diagnosis and selection of procedures	■			
	Preparation and use of equipment	■			
	Reflection after procedures		■		
	Consideration for patients	■			
	Safety of treatment	■			

Note: This table provides an example of learning progression (represented by ■) of one graduate as a successful case of quality assurance. Numbers 1 & 2 in the rubrics correspond to the order of course series.

III.2.1. Performance assessment at "University study skills" (1st stage)

In "University study skills" students are given essay assignments, which form the basis for the assessment of problem solving, logical thinking and written communication skills.[27] Teachers offer broad themes for the assignment, and out of many possible problems students take up a specific problem for their essays. Then, they not only investigate their problems, but they themselves formulate their own claims and conclusions. Teachers then assess essays using a rubric containing six dimensions and four levels.

III.2.2. Performance assessment of "PBL" (2nd stage)

As mentioned above, the MTJ employs two different rubrics for the assessment of two types of performances, namely written tasks based on scenarios about paper patients and role plays with simulated patients.

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[27] Kayo Matsushita, Kazuhiro Ono, and Yusuke Takahashi, "Development of a Rubric for Writing Assessment and Examination of Its Reliability," *Journal of the Liberal and General Education Society of Japan* 35, no. 1 (2013): 109-12 [in Japanese]; Kazuhiro Ono and Kayo Matsushita, "Assessment of Writing in First-Year Education," *In Assessment of Active Learning,* eds. Kayo Matsushita and Terumasa Ishii (Tokyo: Toshindo, 2016), 28-39 [in Japanese].

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III.2.3. Performance assessment of "Model practice & simulation training" (3rd stage)

In "Model practice & simulation training," patients' problems are identified based on model representation of patient's oral cavity, patient scenarios, roentgen photographs and examination findings. Next, students propose appropriate treatment policies and treatment plans, which is carried out in a model, and based on the judgment of results they modify their treatment plan, and teachers then assess the content of student worksheets that recorded the process by using a four-level rubric.[28]

III.2.4. Performance assessment of "Clinical practicum" (4th stage)

In order to assess dental clinical competences, "Clinical practicum," where patient treatment is conducted, implements portfolio assessment as formative assessment and clinical performance assessment as summative assessment.

In portfolio assessment, students set their own target of the day before they begin dental treatment for their patients, and after the practicum they record in e-portfolios details about procedures and content of dental treatment, acquired knowledge and special skills, and cultivated attitudes and values as a medical professional. Students also conduct a self-assessment on a five-level scale, in order to assess the degree to which they could accomplish the treatment by themselves. Likewise, the teacher, who is in charge of his/her students, assesses the degree to which they could accomplish the treatment on a five-level scale and assigns them teacher comments/instructions for further learning.[29]

As for the clinical performance assessment, at the end of the clinical practicum, students' dental treatment, to which students apply as their final exam is assessed in a clinical setting by a professional dentist, who is also the teacher in charge of the practicum. The performance assessment is implemented under six dimensions such as "interviewing and gathering information." These dimensions are assessed on a three-level scale, namely "well done," "somewhat

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[28] Nami Akiba et al., "An Introduction to the Undergraduate Comprehensive Model Practice Course at the Faculty of Dentistry, Niigata University," *The Journal of Japanese Dental Education Association* 33 (2017): 110 [in Japanese].

[29] Yohei Oda et al., "Development and Use of a Web-Based E-Portfolio for Dental Clinical Training," *The Journal of Japanese Dental Education Association* 33 (2017): 67-68 [in Japanese].

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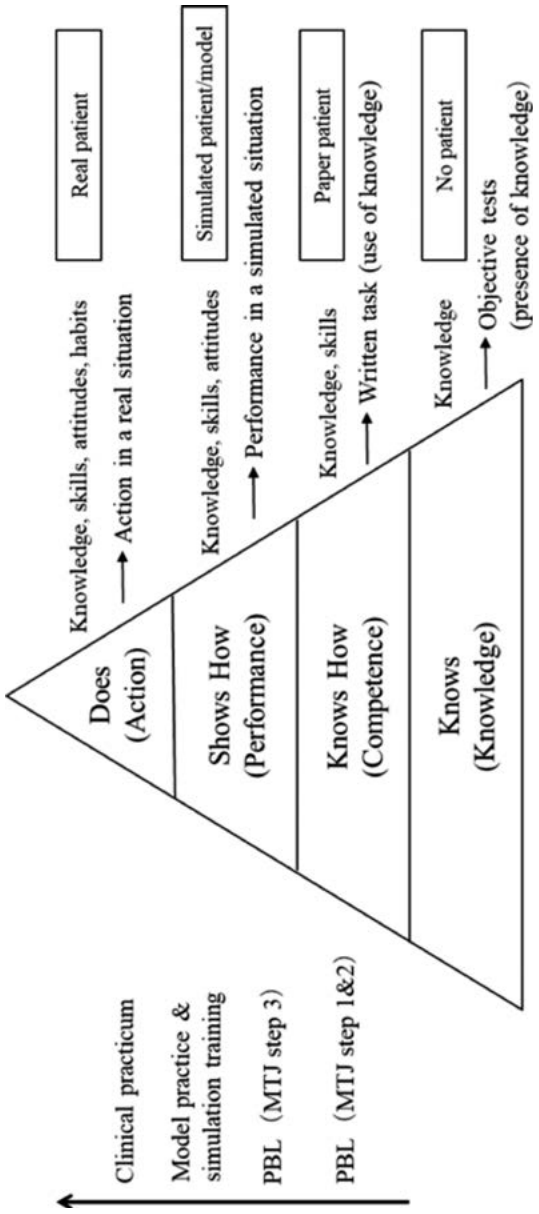

Figure 5
Relationship between Performance Assessments at Key Courses

lacking, but within the acceptable range (acceptable)," "somewhat lacking, outside the acceptable range (unacceptable)."[30]

As described above, there is no patient in "University study skills," whereas "PBL," "Model practice & simulation training," and "Clinical practicum" include a paper patient and its simulated patient based on a scenario, model of oral cavity, and real patient, respectively. Each performance is assessed through faculty-developed rubrics. Using Miller's Pyramid,[31] we can also represent the hierarchy of assessments of "PBL," "Model practice & simulation training," and "Clinical practicum," as illustrated in Figure 5. While PBL's written tasks regarding the paper patient, conducted within steps 1 & 2 of MTJ, relate to *Knows How* (knows how to apply acquired knowledge), role plays conducted in step 3 of MTJ and Model practice & simulation training relate to *Shows How* (shows how to apply that knowledge), and Clinical practicum relates to *Does* (actually applies that knowledge in practice). Hence, through different types of multi-layered performance assessments we can assess the increasingly higher-order dental clinical competences.

How can we then combine performance assessments at the course-level with program-level outcomes assessment? Do they really function as embedded assessments and provide information on student progress at both the course- and program-levels?

IV. **Relationship between course- and program-level assessments**

IV.1. *Quality assurance of graduates through embedded performance assessment*

Table 4 depicts the image of quality assurance of graduates through embedded performance assessment. Within the four key courses, "University study skills," "PBL," and "Model practice & simulation training" require Level 2 and above on the rubrics in order to pass, whereas "Clinical practicum" requires a level of at least "acceptable" (out of "well done," "acceptable" and "unacceptable") in order to pass. Each of the firstly mentioned three key courses extends over two school semesters/years and

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[30] Noritaka Fujii et al., "Competency Assessments for Undergraduate Students in Clinical Clerkships at the Faculty of Dentistry, Niigata University," *The Journal of Japanese Dental Education Association* 33 (2017): 6-7 [in Japanese].

[31] George E. Miller, "The Assessment of Clinical Skills/ Competence/ Performance," *Academic Medicine* 65, no. 9 (September Supplement 1990): S63.

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includes two rounds for each, such as "PBL1" and "PBL2." Even if passing criteria in the number 1 course (e.g., PBL1) are not achieved, it is sufficient to achieve level 2 and above in the subsequent number 2 course (e.g., PBL2). As for the last key course "Clinical practicum," students can surpass the passing criteria of final clinical performance assessment by following the daily portfolio assessments and teachers comments (this process is recorded in the e-portfolio). In this manner, each key course's performance assessment incorporates the function of formative assessment in the way that it is designed for students to achieve the passing criteria by the time they complete each kind of key courses.

Of course, as shown in Figure 4, many courses besides the key courses are included in the dental education program. Many of those courses aim for students' acquisition of "knowledge" or "knowledge and skills" (see Figure 5), where the assessment is entrusted to the expert judgment by individual teachers who award credits.

This is how students are conferred the undergraduate degree through fulfilling the passing criteria in key courses and earning the credits necessary for completing the whole curriculum. In addition, by completing the undergraduate program students become eligible for the National Board Dental Examination.

IV.2. *Comparison of program-level assessments*

Out of the four types of learning outcomes assessment described in the outset of this paper (Figure 1), the typical assessments that have been adopted at the program level are: questionnaire surveys (type II), objective tests at the end of degree program (type III), portfolio assessments and performance assessments, such as in capstone courses.[32] Table 5 organizes the respective assessment methods according to their characteristics: assessment validity, reliability, feasibility, and compatibility with a credit system, where graduation is approved only upon the acquisition of credits in all courses.

First, as substituting questionnaire survey of students with direct assessment is considered difficult,[33] we excluded it from our analysis in this

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[32] Suskie, *Assessing Student Learning*, chap. 1; Ewell, Paulson, and Kinzie, *Down and In*, 9.

[33] Gary R. Pike, "Limitations of Using Students' Self-Reports of Academic Development as Proxies for Traditional Achievement Measures," *Research in Higher Education* 37, no. 1 (1996): 89-114; Yugo Saito, Kazuhiro Ono, and Kayo Matsushita, "Correlations of Direct Measures Based on Performance Assessment and Indirect Measures Based on Student Self-report," *Japan Journal of Educational Technology* 40 (Suppl.) (2016): 157-60 [in Japanese].

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Table 5
Comparison of Program Level Assessments

Type	Program-level assessment	Validity	Inter-rater reliability	Feasibility	Compatibility with a credit system
II	Questionnaire survey (indirect, quantitative assessment)	Substitute of direct assessment is problematic.	–	High	Low
III	Objective test as add-on asssessment (direct, quantitative assessment)	Suitable for assessing factual knowledge, but not necessarily for integration of knowledge and higher-order skills.	–	High	Not high (Sometimes the test results don't match with the expected results based on the aquired credits.)
IV	Portfolio assessment (direct, qualitative assessment)	Suitable for assessing learning and growth within a selected time period.	Assessor's training is required.	Medium or low (It requires second scoring. Assessment burden depends on the volume of assessment objects and the methods of second scoring.)	Not high (Sometimes the results of second scoring don't match with the expected results based on the aquired credits.)
IV	Performance assessment at all courses (direct, qualitative assessment)	Suitable for assessing knowledge integration and higher-order skills, and it can cover the whole program.	Assessor's training is required.	Low (Although second scoring is not required, assessment burden at all courses is high.)	High (The asessment result of each course can be directly used in a credit system)
IV	Performance assessment at key courses (direct, qualitative assessment)	Suitable for assessing knowledge integration and higher-order skills, but it cannot cover the whole program.	Assessor's training is required.	Relatively high (Second scoring is not required. Although assessment burden at each key course is high, the number of courses is limited.)	High (The asessment result of each course can be directly used in a credit system)

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paper. Even though their feasibility is high, objective tests conducted at the end of the program as an add-on assessment are not suitable for the assessment of higher-order skills nor knowledge integration. At the same time, their compatibility with a credit system is not high. As for portfolio assessment, the requirement of second scoring by the faculty team is thought to decrease the assessment feasibility.[34] In case performance assessment is conducted in all courses, second scoring is not required and moreover the compatibility with a credit system is high, but the assessment burden becomes significant.

In contrast to the four methods discussed above, the method of performance assessment conducted only at key courses imposes a considerable assessment burden, but as it is limited only to those courses, its assessment feasibility is relatively high. Likewise, it is adept at directly assessing knowledge integration as well as higher-order skills, which are included in the program's goals. A prime example is the performance assessment at capstone courses. However, capstone courses cannot cover the whole program.

Our proposed method is performance assessment at key courses only by a faculty team with other courses left to the expert judgment of individual teachers, thereby we connect assessments at the course and program levels while covering the whole curriculum. We call the method of embedded performance assessment at key courses "Pivotal Embedded Performance Assessment (PEPA)."

Considering the assessment burden, our method focuses the object of performance assessment on selected key courses requiring the integration of knowledge and higher-order skills, which are placed at critical juncture points in curriculum (divided into four stages in the case of the Faculty of Dentistry at Niigata University), thereby insuring assessment validity as well as assessment feasibility and compatibility with a credit system. Furthermore, reliability, especially inter-rater reliability, is guaranteed through the collaboration of a faculty team, consisting of numerous teachers in charge of the courses, that develops rubrics and implements assessment including calibration and moderation.[35] In this way, by arranging the key courses directly linked to program-level goals sequentially within the curriculum, we combine performance assessments conducted by a faculty team at key

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[34] Banta and Palomba, *Assessment Essentials*, 103-05.

[35] Suzanne Lane, "Performance Assessment: The State of the Art," in *Beyond the Bubble Test: How Performance Assessments Support 21st Century Learning*, eds. Linda Darling-Hammond and Frank Adamson (San Francisco: Jossey-Bass, 2014), chap. 5, Kindle; Terrel Rhodes and Ashley Finley, *Using the VALUE Rubrics for Improvement of Learning and Authentic Assessment* (Washington D.C.: Association of American Colleges and Universities, 2013), 17-25.

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courses with assessment of knowledge and skills conducted by individual teachers at other courses. This is the method of program-level assessment presented in our research.

As described above, Japanese dental education programs require students to pass standardized common achievement test and clinical examination (CBT and OSCE) before they can start their clinical practicum (Figure 4) and the National Board Dental Examination upon graduation, so that benchmarking can be conducted along these external standards. However, as CBT and the national board examination represent an objective test of individual knowledge and thinking skills, it is difficult to assess the knowledge integration and higher-order skills. OSCE assesses skills and attitudes in the simulation settings, but it cannot assess the competences that are expected to be cultivated by clinical practicum.

Moving from "University study skills," "PBL," "Model practice & simulation training" to "Clinical practicum," the performance assessments in this research are designed to evaluate generic problem-solving skills as well as subject-specific problem-solving skills represented in this case by dental clinical competences. In accordance with this process, the scope of cultivation and assessment of problem-solving skills becomes increasingly specialized as well as comprehensive, while the assessment setting is designed to embody higher state of authenticity (see Table 3 and Figure 5). The results of student questionnaire after the last performance assessment in "Clinical practicum" showed numerous positive responses, such as "I could understand my clinical competences more objectively," "This assessment told me what should be improved," "CBT and OSCE cannot replace this assessment."[36]

As shown in Table 4 under the "Clinical practicum," out of the three levels (well done, acceptable, unacceptable), students can pass only if they achieve the level of "acceptable," and the level of "well done" indicates the standards to be met in postgraduate clinical training they experience as interns. This is how the rubric attempts to capture a learning progression up to clinical training after graduation. This also sends a message to students that their own learning should become a life-long continuous journey.

V. **Conclusion**

It is difficult to implement program-level learning outcomes assessments even after you are equipped with good course-level assessments. In this

[36] Fujii et al., "Competency Assessments," 7-8.

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paper, building on the performance assessments we developed in some courses, we proposed Pivotal Embedded Performance Assessment (PEPA) as a method for combining assessment at the course and program levels. PEPA denotes that the method adopts the idea of embedded assessment and embodies it in the form of performance assessment in key courses of the curriculum. It consists of the following set of procedures:

(1) Faculty systemize curriculum, clarify the relation between program goals and each course, and segment curriculum into several parts. Faculty select key courses directly linked with program goals, in which students are required to integrate the various knowledge included in each segment and to cultivate higher-order skills.

(2) The faculty team in charge of each key course designs tasks and rubrics of the performance assessment, and implements it. The newly developed different types of performance assessment are sequentially arranged so that their specificity, comprehensiveness, and authenticity increase as student learning progresses. Conversely, the assessment of other individual courses is entrusted to the expert judgment of individual teachers.

(3) In performance assessment at key courses, students have to pass all the courses by demonstrating performance that surpasses a certain level in all rubric dimensions. However, each course's performance assessment incorporates the function of formative assessment, by giving students a second opportunity to achieve the passing criteria in the second round of key course with the same name. Also, each rubric not only applies to the course itself, but can be used longitudinally after the course's completion, indicating the direction of learning progressions.

(4) By fulfilling passing criteria in performance assessment at key courses and obtaining a specified number of credits from a variety of stated regular courses, students are awarded the degree of the program.

Our method called Pivotal Embedded Performance Assessment enables to maintain assessment feasibility and compatibility with a credit system while insuring assessment validity and reliability, through limiting the range of performance assessment to key courses that require knowledge integration and higher-order skills and consequently are placed at the critical juncture points of curriculum, and through designing and implementing the assessment by a faculty team. Although the idea of curriculum-embedded performance

assessment is not a new way of thinking,[37] our PEPA is original in the way that it clarifies what key courses are selected for embedded assessments through alignment with curriculum design, while upholding a formative assessment function and sequentially arranging those embedded assessments.

In this paper, we have elucidated our method taking up the case of dental education program in Japan. We believe that PEPA is a powerful method for combining course- and program-level outcomes assessments. However, it is not clear whether the concept and procedures of PEPA will function effectively in other academic fields. We suppose that it can be utilized not only in dental education but also in medical and pharmaceutical education, which are similar to each other in their curriculum structure. Furthermore, it could be applicable in fields such as education for teachers and legal professions, which includes the progressions in cognition and behavior from Knows, Knows How, Shows How to Does, as depicted in Miller's Pyramid. Our challenge is to explore the ranges of applicability of PEPA and its potential constraints in further research.

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[37] Cummings, Maddux, and Richmond, "Curriculum-Embedded Performance Assessment," 599-605.

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The re-design of a fourth year Bachelor of Education programme using the Constructive Alignment Approach

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Abstract: The focus of this article is on the re-design of a fourth year Bachelor of Education (B.Ed) programme at the University of the Western Cape (UWC). Due to the changes in teacher qualifications, as outlined in the 2015 *Minimum Requirements for Teacher Education Qualification* (MRTEQ) policy document, Higher Education Institutions were required to adapt their Initial Teaching Education (ITE) programmes to meet the requirements of the new policy document. This article describes the use of a backward mapping approach, in conjunction with the application of a constructive alignment framework, used by the education faculty at UWC to adjust the teaching and learning in the B.Ed programme to address the outcomes and standards required by the MRTEQ policy document. Given the type of student enrolled at UWC, the article provides a discussion on the challenges involved in developing a programme for students who might not have been adequately prepared for their tertiary studies due to the disadvantaged school contexts they come from. The article thus provides a reflective discussion on the challenges involved in the re-design process that used the pre-service teacher competencies expected at the end of the B.Ed programme at UWC, to develop the teaching and learning programme and assessment tasks for the fourth year B.Ed course.

Keywords: Initial Teacher Education; Bachelor of Education programme; backward mapping; constructive alignment; Higher Education Institutions; Curriculum; Education Re-design.

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I. **Introduction**

The focus of this article is on exploring the application of a constructive alignment framework[1] for the re-design of the fourth year education programme at the University of the Western Cape (UWC). Following the publication of the 2015 *Minimum Requirements for Teacher Education Qualification* (MRTEQ) document[2] the UWC faculty staff identified the need to adapt the existing Bachelor of Education (B.Ed) programme at UWC to meet the requirements of MRTEQ. The MRTEQ policy document provides the basis for the construction of core curricula for Initial Teacher Education (ITE). This article describes this process and discusses the constructive alignment (CA) approach as a framework for adjusting teaching and assessment programmes in higher education institutions (HEIs) to address the proposed outcomes and standards required by the MRTEQ policy document.

Given the challenge of adapting the B.Ed programme to align with the MRTEQ document, the UWC staff within the Educational Practice course chose to use a form of 'backward mapping'. By backward mapping, we refer to the process of identifying the required competencies that fourth year pre-service teachers need to attain by the completion of their training as outlined by MRTEQ, and then developing the programme retrospectively from the fourth year B.Ed course to the third, second and first year course outcomes. This approach develops the programme design and teaching and assessment methods by focusing on the desired learning outcomes that pre-service teachers should have attained before beginning their teaching career, aligning the fourth year course activities to meet these requirements, and then developing the preceding years accordingly.

Further in the consideration of the design of the programme was the need to take into account the diversity of students in HEIs, and specifically, the nature of the student who enrolls at UWC. Biggs[3] states that the challenges of working with the diversified nature of the student population in HEIs often means that many students struggle with the requirements and expectations of higher education learning. This aspect is especially prevalent within the UWC student population, many of whom come from disadvantaged school contexts which have not adequately prepared them for the rigors of tertiary

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[1] John Biggs, "Constructive Alignment in University Teaching," *HERDSA Review of Higher Education* 1 (2014), 5-22.

[2] Department of Basic Education, *National Qualifications Framework Act (67/2008): Revised Policy on the Minimum Requirements for Teacher Education Qualifications (*Pretoria, 2015).

[3] John Biggs, "What the Student Does: Teaching for Enhanced Learning," *Higher Education Research & Development* 31, no. 1 (2012): 39-55.

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studying. Biggs[4] goes on to note that given these challenges it is necessary to think carefully about how an institute develops a technology of teaching that engages and supports all students to be successful in the learning processes.

This article begins by situating the debate within teacher education and includes a discussion on the use of the constructive alignment approach in designing teaching and assessment practices within the ITE programmes at UWC. This provides the necessary outline for the discussion that follows that describes the UWC university context, the B.Ed programme specifically focusing on the fourth year course (EDC 401), and the challenges involved in adapting the current B.Ed programme given the type of student who registers to study at UWC. This is followed by a discussion on how the course was re-developed with a focus on constructive alignment by describing pre-service teacher competences, developing the Intended Learning Outcomes (ILOs) and linking these to the teaching and assessment tasks. The final section of the article reflectively discusses the newly developed course in terms of the challenges involved in the re-design process.

II. **Setting the context**

II.1. *Institutional context*

According to the UWC strategic plan, the historical location of the university can be classified as a Historically Black Institution (HBI).[5] The profile of the UWC student is mainly working class and many of the students come from schools in disadvantaged communities where they often receive an inferior education that does not adequately prepare them for their university studies. An important focus, therefore, within the re-design of the ITE programme at UWC, was that it placed an emphasis on students initially spending more time during their studies on theoretical aspects of ITE in order to distantiate them from their own experiences of schools and education. This process is what the literature refers to as an 'apprenticeship of observation'.[6,7]

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[4] John Biggs, "What the Student Does: Teaching for Enhanced Learning," *Higher Education Research & Development* 31, no. 1 (2012): 39-55.

[5] University of the Western Cape, *Charter of Graduate Attributes and Strategic Plan for Teaching and Learning* (Cape Town, 2009), 5.

[6] Dan Lortie, *Schoolteacher: A sociological study* (Chicago: University of Chicago Press, 1977).

[7] Pamela Grossman, "Overcoming the apprenticeship of observation in teacher education coursework," *Teaching and Teacher Education* 7, no. 4 (1991): 345-357.

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What this literature makes reference to, is that unless students are exposed to alternative ways of thinking about the teaching and learning process, they will tend to reproduce the way in which they themselves experienced education during their schooling. As many UWC students were not exposed to good quality and varied learning experiences during their schooling, it is necessary for the B.Ed programme to ensure that the students are exposed to theory on teaching and learning scenarios beyond their own schooling experiences. Grossman[8] notes, that these deeply ingrained 'apprenticeship of observation', i.e. the way in which the students have observed teaching and learning to take place prior to their entry into the university, needs to be challenged.

Drawing on the 'apprenticeship of observation' understanding, the education practice faculty staff at UWC felt that exposing students to more theory during the early stages of their degree completion would assist to provide new and alternate educational knowledge to ameliorate their prior schooling experiences as a learner. This focus would require that additional support be provided during the B.Ed programme to guide the students to interpret the new theoretical knowledge and educational concepts in the course. Within UWC this is particularly important as highlighted by the pilot National Benchmarking tests conducted at UWC in 2009 that tested a sample of students in the areas of Academic Literacy and Mathematics and categorised students into three domains of proficient, intermediate and basic bands. The outcome of the tests indicated that many UWC students fall into the 'basic band' of proficiency and thus require programmes which offer a great deal of learning support in order for them to achieve a quality degree in a reasonable time period. What this means for many students enrolling at UWC, is that they may require additional time for their induction into academic literacy at the university if they are to succeed, and further, without this support, student throughput may be severely affected. This issue is supported by the fact that the university output statistics show that there is a significant attrition rate of students entering the courses to students graduating. Some of these factors may include, (1) students dropping out because they are not coping with the course, (2) financial constraints, (3) lack of support from parents, university staff, peers, and (4) lack of support from the system, i.e. the university teaching not supporting the students' learning.

Focusing on finding ways to support the students from within the university system was an important component when considering the re-design of the B.Ed programme. Academic staff development with regard to

[8] Pamela Grossman, "Overcoming the apprenticeship of observation in teacher education coursework," *Teaching and Teacher Education* 7, no. 4 (1991): 345-357.

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teaching and learning – theories of learning, curriculum alignment, teaching strategies, assessment and quality assurance – in this regard is essential.[9] For improved throughput within the B.Ed programme in the UWC context, therefore, a different conception of teaching and learning is required. With this in mind, a structured approach to course and programme design within the B.Ed programme, one that would be of benefit to the student learning experience and the faculty teaching programme at UWC, was envisaged. The focus of the new programme would be on developing a programme that could guide course development for optimal teaching and learning within the specific requirements of the profile of the MRTEQ document and the student who enrolls at UWC.

II.2. *The re-design context*

In order to consider the way forward in the B.Ed course re-design, the author of the article attended a course offered by the *Tuning Academy* that focused on the design and implementation of HEIs quality qualifications. The *Tuning Academy* is an international institution that focuses on matters relating to teaching and learning processes in higher education. The author of this article was invited to take part in the *'Tuning Africa'* programme that offers a network of communities of academic experts who meet together to discuss and collaborate around teaching and learning instruments with a focus on designing new programmes or adapting existing programmes as required within their higher institution.

The first phase of the *Tuning Africa* pilot project was implemented from 2011-2013 and included sixty different universities in Africa. Different groups focused on five subject areas, one of which was teacher education. The aim was for the participants in the course to share knowledge and experiences in order to develop curricula that was tailored to meet the unique needs specific to the subject discipline and HEI context. The outcome of the author's involvement in this experience was the re-design of the UWC's B.Ed four year programme. The B.Ed programme at UWC focuses on the Senior Phase of schooling and prepares pre-service teachers to teach at schools in Grades 7-9, working with children between the ages of 13-15 years old. The author chose to focus specifically on the Education Practice (EDC 401) aspect of the fourth year B.Ed course as this is a core course module of the programme.

[9] Council on Higher Education, *Council on Higher Education 2007-2008 Annual Report* (Pretoria, 2008).

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II.3. *The ITE curriculum*

The ITE curriculum in South Africa has evolved from the first national policy governing the provision of teacher education, the Norms and Standards for Educators (Department of Education, 2000), that stipulates that ITE programmes should prepare prospective teachers for seven different 'roles of the educator'. This was expanded in the MRTEQ policy document that states that by the end of their ITE, qualifying teachers should have achieved ten exit level outcomes, verified against a set of eighty-nine assessment criteria.[10] The publication of the MRTEQ document has thus impacted on South African teacher educators who have found themselves grappling with how to re-organise coursework and practicum expectations around the fairly extensive lists of discrete roles, outcomes and competences found in the document.[11] As a result many HEIs are currently adapting or re-designing their ITE programmes to meet the requirements of the MRTEQ document.

Alongside the programme development of ITE, there are macro-factors considerations beyond the faculty level, like institutional-level and government-level requirements. For instance, the current trend in higher education both internationally and nationally is to improve access and outcomes of all university students. Diverse students from varying backgrounds have access to higher education, and university classrooms are no longer occupied by students who are only economically privileged and the academically elite.[12] What this means, is that the learning environment and interaction with the students in lecture rooms within HEIs needs to be adapted to the needs of the diverse student demographics and thus the variable levels of support that the students require.[13] Devlin and Samarawickrema[14] suggest that in the past, a high challenge/low support

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[10] Lungi Sosibo, Willie Van Vollenhoven, Lee Rusznyak, and Robert Balfour, "Why academic depth and rigour in university-based coursework matters for prospective teachers," *Perspectives in Education* 34, no. 1 (2016): 1-9.

[11] Roy Killen, Nieman M, and Fraser William, "Issues in competence and pre-service teacher education. Part 2: the assessment of teaching practice," *South African Journal of Higher Education* 19, no. 2 (2005): 246-259.

[12] Helen Larkin and Richardson Ben, "Creating high challenge/high support academic environments through constructive alignment: student outcomes," *Teaching in higher education* 18, no. 2 (2013): 192-204.

[13] John Biggs, "What the Student Does: Teaching for Enhanced Learning," *Higher Education Research & Development* 31, no. 1 (2012): 39–55.

[14] Marcia Devlin and Samarawickrema Gayani, "The criteria of effective teaching in a changing higher education context," *Higher Education Research & Development* 29, no. 2 (2010): 111-124.

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learning environment was considered desirable, but in order to accommodate the changes in student demographics, a high challenge/high support environment is necessary. Consequently, with the massification and internationalisation of higher education, there is a corresponding change in requirements at the institutional and governmental level. Thus, there is pressure for universities to re-define and demonstrate effective teaching for a broader range of students and for the faculties within universities to re-align their programmes to meet the macro-needs of the country.

Higher education in South Africa is following a similar trend. In South Africa, the history of teacher education emulates the international educational landscape, with broader access to schools and universities changing the demographics of the institutions within an evolving learning environment. A fundamental challenge for schools is to find teachers who can develop their learners within a multicultural, multilingual and integrated classroom learning environment. This in turn impacts on ITE programmes because the challenge is to design curricula with selected knowledge and skills – recontextualising principles –[15] that offer powerful teacher training in the limited time available. The aim of this study was to re-design a final year course within a B.Ed programme using the constructive alignment approach guided by Biggs' framework.[16] This approach guides the development and alignment of key teaching and assessment dimensions of a programme to meet the desired outcomes of a course. The course re-design discussed in this article focused on aligning the B.Ed programme at UWC to consider the acquisition, integration and application of knowledge in the ITE programme drawing on the institutional requirements as well as the competencies as outlined in the MRTEQ policy document.

III. **A Constructive Alignment approach to programme re-design**

Biggs[17] argues that constructive alignment is an approach that is appropriate for guiding the design process of adapted curriculum courses as it embraces the whole system, taking into account the departmental, institutional and classroom levels. His framework encourages a system of

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[15] Basil Bernstein, *Class, Codes and Control,* vol. 3: *Towards a Theory of Educational Transmissions (*London: Routledge, 1975).

[16] John Biggs, "What the Student Does: Teaching for Enhanced Learning," *Higher Education Research & Development* 31, no. 1 (2012): 39–55.

[17] John Biggs, "What the Student Does: Teaching for Enhanced Learning," *Higher Education Research & Development* 31, no. 1 (2012): 39–55.

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curriculum design that optimises the conditions for quality learning where all aspects of teaching and assessment are aligned to support high level learning. Accordingly, the move toward a system where the design of the teacher education programme is aligned to the needs of the students is likely to encourage all students, and not only the 'academic' students, to use higher-order learning processes. Grossman[18] and Lancaster and Auhl[19] argue that teacher education programmes within the international education context often involve uncoordinated knowledge-centred courses that do not align with the requirement of the 'field experiences' of initial teacher education (ITE). The challenge, therefore, for teacher educators, is to align the ITE programmes and courses to cater for the theoretical and practical growth of diverse students while meeting the ITE policy requirements.

In order to teach for enhanced learning, Biggs[20] suggests a constructive alignment (CA) framework to help teachers reflect on what they are doing. According to Cain and Woodward,[21] CA is a student-centred model of education that aims to enhance learning through the amalgamation of constructivism and aligned curriculum. CA involves the following three steps:[22]

- To align teaching objectives
- To use teaching methods to realise these objectives
- To use assessment tasks to address the objectives to test whether students have learned what the objectives state they should be learning

The principle of CA involves clearly stating what the outcomes of the intended teaching are, that is, what the student will be able to do at the end of the course.[23] This is expressed as the Intended Learning Outcome (ILO) and requires course or curriculum developers to devise Teaching Learning

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[18] Pamela Grossman, "Overcoming the apprenticeship of observation in teacher education coursework," *Teaching and Teacher Education* 7, no. 4 (1991): 345-357.

[19] Julie Lancaster and Auhl Greg, "Encouraging pattern language development in a pre-service inclusive education course: A comparative study," *International Journal of Disability, Development and Education* 60, no. 4 (2013): 363-381.

[20] John Biggs, "Enhancing teaching through constructive alignment," *Higher education* 32, no. 3 (1996): 347-364.

[21] Andrew Cain and Woodward Clinton, "Toward constructive alignment with portfolio assessment for introductory programming," *Teaching, Assessment and Learning for Engineering (TALE),* (2012 IEEE International Conference): 1-11.

[22] John Biggs, "What the Student Does: Teaching for Enhanced Learning," *Higher Education Research & Development* 31, no. 1 (2012): 45.

[23] John Biggs and Tang Catherine, *Designing intended learning outcomes* (England: Open University Press, 2007), 113-132.

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Activities (TLAs) that require the students to actively construct meaning from the knowledge and learning they are presented with during the study programme. Programme ILOs are derived from several sources, but essentially they must align with attributes of the ideal graduate from the university, the faculty and professional bodies of their course discipline. In the South African education context this would for example refer to the requirements of the specific HEI, the education faculty and specific department within the faculty and the MRTEQ policy document. In order to achieve these ILOs the CA approach suggests that the general aims of the programme should be listed in five or six statements which are then converted into programme ILOs. This is best accomplished by incorporating verbs such as 'design', 'reflect', 'hypothesise', 'generate', and so forth. The focus here is on supporting the expository focus of lectures with actual tasks where the student is required to *do* authentic tasks related to their learning.

IV. **Developing the Course**

IV.1. *Initial foundations of EDC 401*

At UWC, our goal is to prepare a holistic pre-service teacher with a balance of theoretical, practical and affective attributes. Given the complexity of teaching, there are a multitude of concepts and techniques important for pre-service teachers to learn within a programme. On the one hand, programmes can give the students exposure to a multitude of theories, tips, techniques, concepts, skills and practices. But including all of the concepts in the programme is likely to result in an overcrowded and fragmented curriculum. The programme, therefore, should be designed to include a mix of knowledge and skills that develops the pre-service teachers towards attaining the requirements as encapsulated within the MRTEQ document by the end of the programme.

IV.2. *Structure of EDC 401 within the B.Ed Programme at UWC*

The course that is the focus of this article is located within the B.Ed programme comprising of a total of 480 credits. There are approximately 1500 students within a cohort. The course Educational Practice (EDC) is developmental, from the first year (EDC 101) to the fourth year (EDC 401), with the accompanying number of credits (see Figure 1). This course is a

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compulsory full-time course for fourth year education students (EDC 401), and is defined by 60 credits. On average 250 students complete this course each year. This is a core course which means that if students fail the course they will have to repeat the entire year of study.

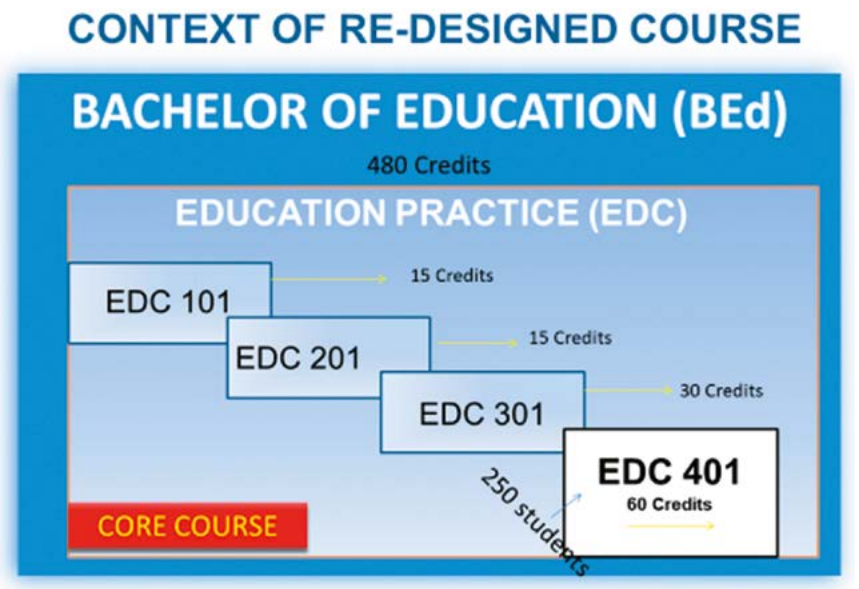

Figure 1

Credits accumulated over the EDC four year programme

The four year Education Practice (EDC) programme at UWC was designed to develop a conceptually coherent and contextually responsive curriculum. In the first year (EDC 101) and the second year (EDC 201), the knowledge that is selected aims to provide theoretical and disciplinary knowledge to give the pre-service teachers the conceptual tools to analyse and reflect on their educational assumptions from their own schooling experiences, as to what constitutes effective teaching and learning. Importantly, as discussed previously, the initial two years of the teaching programme also attempts to distantiate the pre-service teachers from the experientially-acquired norms of teaching experienced in their own schooling. Many UWC students enter their first year university programme coming

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from largely dysfunctional schooling systems, where pervasive practices like insufficient engagement with conceptual knowledge and use of corporal punishment could be considered normal in their practice.[24]

In order to interrupt the students' perception of how schooling takes place, the UWC programme was designed to provide the student teachers in their initial two years of teacher training with the theoretical and conceptual knowledge of good teaching practices before exposing them to school sites. For this reason the teaching practice aspect of the B.Ed programme is designed to minimise the student teachers' school contact to two weeks of classroom observation only in their 2nd year of studying. It is hoped that by providing the students with a new theoretical and conceptual lens during their course work, this will enable them to re-consider or re-conceptualise aspects of teaching and learning before they begin the practical aspect of the B.Ed programme. The theoretical and conceptual components of the B.Ed programme are therefore structured in a specific manner to support this. In the students' first and second year in the B.Ed programme, they are equipped with theory that they can then begin to apply in practice during their third and fourth year.

In the third (EDC301) and fourth (EDC401) year of the B.Ed programme, the selection of relevant knowledge is organised around principles that foreground situational and practical knowledge as it is envisaged that by this time the students should be able to use the theoretical and conceptual tools that they have been provided during their first two years of studying, to adapt their teaching to varied and diverse school contexts. The thinking behind this approach is that by providing pre-service teachers, specifically those who completed their schooling in dysfunctional or disadvantaged school contexts, with the necessary conceptual tools prior to the commencement of the practical component of their training, allows them to use a more theory-informed approach when faced with the limitations and structural constraints found in different school context. Attempts to prepare pre-service teachers for *specific* contexts are more likely to entrench rather than alleviate inequalities, as the emphasis is on contextual relevance and not the powerful knowledge that enables teachers (and their learners) to participate in nationally important conversations that transcend local contexts.[25] Programmes that prepare pre-service teachers, via a theory-informed

[24] Brahm Fleisch, *Primary education in crisis: Why South African schoolchildren underachieve in reading and mathematics* (Cape Town: Juta, 2008).

[25] Michael Young, "From constructivism to realism in the sociology of the curriculum," *Review of research in education* 32, no. 1 (2008): 1-28.

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approach for diverse teaching contexts, thus move away from giving teachers only survival tips and coping skills for teaching in contexts, which is argued to be anti-intellectual.

IV.3. *Competences*

The influences of many systems shape the development of a programme, particularly at three levels, national competences, university competences and faculty competences. National competences are shaped by the requirements of the national curriculum and policy requirements. University competences are shaped by the requirements of the university, particularly the graduate attributes as espoused by the university. Faculty requirements are shaped by the experts in the specific faculty and, as in the case of the B. Ed programme, the faculty staff's view of education. The development of new or adapted programmes must therefore be carefully scaffolded to take all levels of competence into account starting from a foundation national competences (curriculum and policy), university competences (graduate attributes), faculty competences (requirements of the programme), and finally departmental competences (if different from the faculty). In the South African teacher education context the national curriculum is framed by the MRTEQ document, the graduate attributes are outlined in the UWC strategic plan, the faculty competences and rules for the course are outlined in the UWC year book, and the departmental competences are specific to the course as provided in the course outline. All these competences must integrate in order to develop a successful UWC teacher graduate.

IV.4. *Minimum Requirements for Teacher Education Qualification (MRTEQ)*

The first curriculum policy for teachers in South Africa was the Norms and Standards for Educators document[26] which introduced seven inter-related roles for teachers as key criteria for the development of teacher qualifications. With the input of key stakeholders in South African education the policy was subsequently strengthened and the revised MRTEQ document was published by the minister of Higher Education and Training in the Government Gazette No 38487 on the 19 February 2015. The MRTEQ

[26] Department of Basic Education, *Norms and Standards for Educators* (Pretoria, 2000).

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specifies a set of minimum requirements for teacher education to ensure that the higher education system produces teachers of quality in line with the needs of the country. To promote the development of teachers with strong conceptual and contextual-driven teaching, the MRTEQ promotes various types of knowledge that must underpin teachers' practice, while encapsulating all of these in the notion of integrated and applied knowledge for teacher education.[27] The focus of the integrated and applied knowledge is that it enables teachers to be able to draw on a reservoir of knowledge, mixing the theoretical and practical, to guide their decisions in the moment of practice. This focus places an emphasis on the 'what' and 'how' of learning with careful scrutiny of which knowledge should guide one's action within a given moment of practice. Further, the ideal is that reflection, connection of various knowledge and synthesis of knowledge and practice should be foregrounded in every decision made. To this end, the MRTEQ describes clear and specific requirements for the development of teacher education learning programmes, as well as guidelines regarding practical and Work Integrated Learning (WIL) structures. MRTEQ specifies that different types of knowledges that are required for the acquisition, integration and application of knowledge for teaching purposes, listing them as: disciplinary learning, pedagogical learning, practical learning, fundamental learning and situational learning. These five types of learning and knowledge should provide the basis of the curriculum, with different minimum credits assigned to a specific course throughout the programme. Each of these knowledge areas within ITE are important in order to develop a conceptually coherent and contextually responsive teacher.[28]

For the purposes of the current re-designed course (EDC 401) at UWC, the focus was on ensuring that the B.Ed programme integrated the mix of knowledge as required by MRTEQ, as well as making certain that the practical aspects of the course, namely the practical and situational knowledge component of teaching practice, and to a lesser extent the integration of Information and Communications Technology (ICT) in fundamental learning and knowledge component, were included in the module. These knowledge components are described and the role that they play in teacher education discussed.

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[27] Department of Basic Education, *National Qualifications Framework Act (67/2008): Revised Policy on the Minimum Requirements for Teacher Education Qualifications* (Pretoria, 2015), 10-11.

[28] Lungi Sosibo, Van Vollenhoven Willie, Rusznyak Lee, and Balfour Robert, "Why academic depth and rigour in university-based coursework matters for prospective teachers," *Perspectives in Education* 34, no. 1 (2016): 1-9.

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Firstly, practical knowledge is the condition for the development of tacit knowledge, which is an essential component of learning to teach.[29] This type of knowledge can be described in two parts of learning, namely, learning *from* practice and learning *in* practice. Learning *from* practice includes the study of practice mainly in university lectures, for instance, analysing contexts, videos, lesson observations, and so forth. On the other hand, learning *in* practice is the teaching practice period at schools, including aspects of learning from practice, for example, teaching in the classroom, observing lessons and reflecting on lessons by other students. Secondly, situational knowledge is knowledge of varied situations, contexts and environments of education (for example, the classroom, schools, communities, districts). Studying education in different social contexts allows the pre-service teachers to understand the nature and complexity of society and the diverse challenges faced by various school contexts. Finally in fundamental knowledge the focus was on learning to use ICT's as a tool in classroom teaching and learning. The mix of these knowledges, therefore, provides a basis for the design of the curriculum for EDC 401, the practical component of the B.Ed programme, and these are considered together with the minimum set of competences required from a newly qualified teacher in the re-design of the course.

Table 1 below provides an outline of how the various learning outcomes, graduate attributes and assessment tasks for the EDC 401 were aligned taking into account the requirements of the course from the MRTEQ policy document, as well as the university, faculty and departmental requirements for the programme.

V. **Proposal for the Revised B.Ed Course**

V.1. *Mapping the MRTEQ Competences into the B.Ed programme*

In order to start the process of re-designing the EDC 401 course the author examined the various levels of competences in required for the UWC graduate attributes, faculty competences and the MRTEQ policy document. First, the department faculty reflected on the current programme at UWC and our current practices as lecturers within the programme.

[29] Department of Basic Education, *National Qualifications Framework Act (67/2008): Revised Policy on the Minimum Requirements for Teacher Education Qualifications* (Pretoria, 2015), 12.

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Table 1

Graduate Attributes, Learning Outcomes and Assessment:
Table showing the alignment of learning outcomes, graduate attributes and assessment tasks

Education Practice 401
Graduate attributes, learning outcomes, learning activities, assessment criteria and assessment tasks

UWC Graduate Attributes & (MRTEQ)	Learning outcomes	Teaching/Learning activities	Assessment tasks and criteria				
			Oral Lesson presentation	Written Lesson Presentation	Professional Development	Reflective Journal	Portfolio
1: Inquiry-focused (Subject and Pedagogical Content Knowledge)	Create a detailed written lesson plan and express it in an oral lesson presentation, showing evidence of an inquiry-focus, with the depth of detailed subject and pedagogical content knowledge (PCK).	Class discussion and in-class exercises Pre-reading exercises Observing and analysing video clips of classroom lessons Analysing video lessons Microteaching Peer group feedback Role-play	Design two lesson plans and express the written and oral presentation applicable in a classroom setting at a school during practice teaching, to be evaluated by the mentor teacher and university lecturer. *See lesson evaluation sheet for criteria*		N/A		
2: Interpersonal flexibility and confidence to engage across difference (Social, contextual and inclusive)	Select the best combination of theory, practice and resources for optimal learner engagement and knowledge acquisition, showing evidence of an awareness and responsiveness to the larger social context for optimal inclusivity during classroom practice.	Lecture Class discussion Critique lesson videos Resource development Guest lectures from experts	Support the knowledge and theories in the designed lesson plans with a blend of creative resources to engage learners in effective and optimal classroom practice appropriate for the school context. *See lesson evaluation sheet for criteria*		N/A	Present written evidence in the reflective journal justifying the choice of combinations of theories and practices in response to contextual variables. *See evaluation sheet for criteria*	N/A

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UWC Graduate Attributes & (MRTEQ)	Learning outcomes	Teaching/Learning activities	Assessment tasks and criteria				
			Oral Lesson presentation	Written Lesson Presentation	Professional Development	Reflective Journal	Portfolio
3: Reflective practitioner	Reflects on own practice by documenting evidence-based self-reflection and feedback from knowledgeable others to describe reasons and present evidence for their point of view.	Analysing reflective pieces Discussion De-briefing on own classroom practice Scrutinising evidence to determine facts	N/A	N/A	N/A	Reflects on practice daily culminating in a weekly summary. Recorded in their Reflective Journal. *See assessment sheet for criteria*	N/A
4: Critically and relevantly literate (Technological literacy and research skills)	Conduct research for lesson preparations using the library, the web and other sources of information.	Oral presentation Practical reports	N/A	N/A	N/A	N/A	N/A
	Reflects using appropriate language and models of reflection	Reflective writing	Appropriate use of Powerpoint (see oral presentation assessment rubric)	Appropriate use of images, pictures on charts, posters, pamphlets, etc. (see oral presentation assessment rubric)	N/A	See rubric for reflective practice	N/A
	Use the Internet, MS Word, MS Excel, MS Powerpoint to prepare lessons (i.e. computer literate)	Oral presentation	Appropriate use of Powerpoint (see oral presentation assessment rubric)	Appropriate use of images, pictures on charts, posters, pamphlets, etc. (see oral presentation assessment rubric)	N/A	N/A	See portfolio assessment rubric

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UWC Graduate Attributes & (MRTEQ)	Learning outcomes	Teaching/Learning activities	Assessment tasks and criteria				
			Oral Lesson presentation	Written Lesson Presentation	Professional Development	Reflective Journal	Portfolio
5: Ethically, environmentally and socially aware and active	Recognise the relationship of teaching to society, technology and the environment and contextual considerations	Class discussion and exercises Reading tasks – popular articles, social media, published articles, books, articles, etc	N/A	N/A	Student is able to critically analyse education articles in terms of the wider implications of education (eg. SES, poverty, education policy; and education as a tool for social change)	N/A	See portfolio assessment rubric
6: Skilled communicators (Communication)	Present a written and oral lesson plan with rational arguments for the adoption of methods whilst modifying their language according to the context and audience. The teacher communicates to enhance student teaching and learning.		Present a clear, well-structured oral presentation and well-structured lessons *See oral presentation assessment rubric*	Present a clear, well-structured written presentation and well-structured lessons *See oral presentation assessment rubric*	N/A	Present a clear, well-structured written reflections *See reflection assessment rubric*	Present a clear, well-structured written portfolio *See portfolio assessment rubric*

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UWC Graduate Attributes & (MRTEQ)	Learning outcomes	Teaching/Learning activities	Assessment tasks and criteria				
			Oral Lesson presentation	Written Lesson Presentation	Professional Development	Reflective Journal	Portfolio
7: Work Autonomously & Collaboratively *(Interpersonal Relations)*	Work independently and collaboratively applying knowledge and practice effectively.	Co-operative learning lecture and home tasks Group research project and oral presentation Reflection tasks on group functioning	Work productively in co-operative learning groups. Shows initiative with lesson development through engaging in collaborative and independent practice with learners and staff at the school.		N/A	N/A	Shows evidence of extramural involvement, and initiating practices.
8: Professional competences	Committed to apply professional responsibilities, adherence to ethical principles in a contextually changing environment, respect for the rights of others, acts fairly, is impartial in decision-making, is consistent in ethical decisions and recognises the importance of a positive work ethic	Discussion Debriefing Readings and analysis of relevant texts Analysing videos Role play	Conducting lessons professionally and ethically		N/A	N/A	Evidence of conduct from teaching practice schools report. Written evidence of conduct from university supervisor. Written evidence of conduct from mentor teacher at school

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Following this we developed the table presented in Table 1 above that aligned the graduate attributes of UWC and the Faculty of Education with learning outcomes of the MRTEQ document and the assessment tasks of the B.Ed programme.

The graduate attributes of UWC outlines eight competences for a student by the end of their undergraduate studies at UWC namely: inquiry-focused, interpersonal flexibility and confidence to engage across difference, reflective practitioner, critically and relevantly literate, ethically, environmentally and socially aware and active, skilled communicators, work autonomously and collaboratively, and professional competences (see Table 1 above). The Faculty of Education, drawing on the UWC student attributes then aligned these attributes with ITE competencies of the B.Ed programme. These competencies are in line with the eleven competences outlined in the MRTEQ document.[30] As part of the re-design process the MRTEQ competencies were recontextualised into six competences (see Table 1) in the EDC 401 course based on the three knowledges that were foregrounded in the programme, namely, practical learning, situational learning and fundamental learning in ICT. Through the concept mapping and reflection on the course by the lecturers involved, and by combining and reconstructing the competences, a final eight attributes were established to describe the academic and practice requirements of a pre-service teacher at UWC. These were *subject and pedagogical content knowledge*, *contextual practice*, *communication skills*, *reflective practitioners*, *critical teaching literacies* and *interpersonal relations*, with an *additional* two key teaching competences that define the key roles of teachers-in-training, namely teacher *reflection* on practice and teacher *professionalism* in practice.

Figure 2 below indicates how the MRTEQ requirements align with the graduate competencies as defined by UWC and the Education Faculty. As noted, the re-design programme added in two additional competencies based on the UWC pre-service teacher outcome requirements of the B.Ed programme.

The first step in the programme re-design was to explicitly state the learning outcomes of a fourth year student in the EDC 401 Education Practice course. These were based on Blooms/Krathwohl Taxonomy. Biggs suggests that verbs are particularly useful markers for operationalising alignment between what we want the students to learn, what is taught to them

[30] Department of Basic Education, *National Qualifications Framework Act (67/2008): Revised Policy on the Minimum Requirements for Teacher Education Qualifications* (Pretoria, 2015), 64.

ALIGNING MRTEQ & GRADUATE COMPETENCIES

	GRADUATE ATTRIBUTES	MRTEQ
1	**Inquiry-focused and knowledgeable**	Subject and Pedagogical Content Knowledge
2	**Interpersonal flexibility and confidence to engage across difference**	Social, contextual and inclusive
3	**Reflective Practitioner**	Additional
4	**Critically and relevantly literate**	Technological literacy and research skills
5	**Ethically, Environmentally and Socially Aware and Active**	Socially Aware and Active
6	**Skilled Communicators**	Skilled communicators
7	**Autonomous and collaborative**	Interpersonal Relations
8	**Professional teaching competencies**	Additional

Figure 2

Re-designing the fourth year B.Ed course at UWC

and what assessment tasks are planned.[31] The course content was then designed to align with these 'actions' in order to develop the students' competency in their teaching as a fourth year pre-service teachers. Thus the action verbs were used to operationalise the way in which the lecturers developed and taught the course content. Verbs are used in a similar way in Table 1, where the final year EDC 401 course is depicted as using high level verbs such as theorise, reflect, generate and apply. Practically speaking, we specify the verbs which describe the behaviours which we want students to enact in the context of the content discipline being taught, specifying levels of understanding that can be used for awarding grades. The Teaching and Learning Activities (TLA) are then developed to elicit those verbs as student outcomes, and they are also embedded in the assessment tasks.

According to Biggs[32] the teaching and learning context of a programme should be set up so that students have every encouragement to react with

[31] John Biggs, "What the student does: teaching for enhanced learning," *Higher Education Research & Development* 31, no. 1 (2012): 39-55.

[32] John Biggs, "What the student does: teaching for enhanced learning," *Higher Education Research & Development* 31, no. 1 (2012): 39-55.

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Teaching Methods	Lectures	Traditional lectures have worked well in large group settings
	Tutorials	Face-to-face interaction with the tutor and a more personalized setting builds student's confidence
	Discussion	Of case studies, materials, videos, current affairs in education
	Practicals	Student teachers spend 7 weeks at schools and apply theory to practice during this time
	Case studies	Helps students analyze and apply theory to varying contextual situations
	Self-directed study	Students do not like independent work, especially independent PBL. But there is limited time to this.

Figure 3

Teaching and Learning activities in the B.Ed course

the level of cognitive engagement that the objectives require. The students should be helped to do what *they* need to do in order to meet the Intended Learning Outcomes (ILOs).[33] In the B.Ed programme re-design, the first two ILOs are about 'applying', which require that the knowledge of theory of the course is learned and understood at a sufficient level by the student to *create* a detailed written lesson plan (Learning Outcome 1) by *selecting* theoretical concepts to teaching in contextually diverse environments. The programme suggests that this content is presented in class discussions, or through pre-reading activities, observation of video material, analysing texts and critiquing video material, lectures, and so forth (Learning Outcome 2). In Learning Outcome 3 the students are encouraged to reflect on their practice and teaching and learning activities applicable to their practice during de-briefing sessions after teaching practice, in-class reflections on written and video material, and through reflections on class or school teaching practice experiences that are recorded in their reflective journals.

Figure 3 presents some examples of Teaching and Learning Activities (TLAs) that were developed to prepare teachers for teaching practice in the course EDC 401. Through the use of lectures and tutorial the students should

[33] John Biggs and Tang Catherine, *Designing intended learning outcomes* (England: Open University Press, 2007), 113-132.

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be exposed to a mix of activities such as group work, independent work, discussion and role-play, to name a few, in order that the students develop both academically and affectively.

Method	Rationale
Lesson Plan & Presentation	Lesson plans will express their written design of the lesson, and will be enacted in class. Part of these assessments will encompass the competences communication, professional practice, reflection.
Reflective Journal	Questions will be reflected on and written in their journal. Students are encouraged to record learning-related incidences, and reflect on them, whether presented in class activities of on teaching practice.
Portfolio	Portfolio will be used for students to collect and document evidence of their experiences. Any resources developed or used in method classes or while on teaching practice can be used.
Professional Practice	Students' conduct and growth professionally will be encompassed in practice and through their portfolio.

Figure 4

Proposed assessment methods for the B.Ed programme

Essential to any programme design is the necessity of the assessment activities being carefully aligned to the TLAs. Since the students are in their final year of study, the verbs used to describe the ILOs should depict a high cognitive level of learning in order to support their ongoing conceptual development of teaching. For instance the words *reflect*, *apply*, *create* should be used to develop the student's ability to apply new knowledge to practice. For the course EDC 401 it was necessary to ensure the alignment of the assessment tasks (ATs) with a focus on higher order thinking skills. In order to align assessments with teaching, the use of the following assessment tasks are envisaged: lesson plans (oral and written), reflective journal, portfolio and professional development. As the final aligning of the adapted B.Ed programme, the proposed assessment tasks are presented below in Figure 4.

VI. **In conclusion**

Changing a programme such as the B.Ed programme at UWC is an iterative process. It requires deep and ongoing reflection on the part of all

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the faculty staff involved. Ensuring that the student competencies, the ILOs, teaching activities and student assessment align showed us the importance of clarity of expression when writing the ILOs and linking them to a competence. As a team we discovered that it was easier to align the course content moving from the outside, that is the university graduate attributes, moving inwards to align these with the faculty visions and course outcomes.

Making any changes to a programme is also a time consuming process that must involve collaboration and ongoing discussion by all those involved in the programme at all levels. It was necessary for all the staff members to work towards an agreement regarding the mix of competences and programme ILOs in order that the course content could be as cohesive as possible. Achieving agreement was not always easy and meeting regularly to reflect and discuss each step of the process was very challenging given the work commitments of the faculty staff. What was particularly helpful in providing the initial momentum to begin the process of changing the B.Ed programme was the demarcated time, and focus, for the staff to reflect, collaborate and discuss the programme and begin the planning of the adapted B.Ed programme to meet the requirements as outlined in the MRTEQ document. Notwithstanding, the biggest challenge throughout the process was staff challenges, especially teamwork and collaboration within the faculty. Though challenging, communication amongst staff members is pivotal to guide course and programme development. Communication should take place at all levels, from individuals, to departments, and with students themselves. Moreover, curriculum pacing, time on task, teaching and assessment activities are all factors that should be planned and communicated in faculty meetings throughout the year. Thus the challenge of collaboration amongst staff can be ameliorated through staff and student interactions, with both permanent and contract staff members – through planning and effective communication throughout the year.

What this article has aimed to provide is not a framework for the re-design of a programme, but a discussion on the journey that the faculty staff embarked on towards changing and adapting the B.Ed programme. The author of the article and education faculty are still involved in the ongoing changes to the B.Ed programme, and it is hoped that the article will engage education lecturers at various HEIs in a productive and ongoing discussion on aspects of adapting or changing teacher education programmes in order that we can ensure that our teachers going forward are excellently prepared for the complex world of schooling within the diverse South African context.

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University as a global actor in the international system of the 21st Century

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Abstract: Since its foundation, the university has always been a relevant actor within the international system as the main producer and transmitter of scientific knowledge. Considered as a global actor and historically interrelated with multiple agents at the national and international level, the university must now face new and powerful challenges within the international context. Since the last decades of the 20th Century, the world has entered a vertiginous path of transformation, driven by multiple and profound global processes that have generated significant changes in all the parameters of the international system and have prompted the creation of a new international system. The research problem that arises in this work focuses on studying whether this new international stage will mean an opportunity for the university as an international actor to assume new roles on a global scale or if, on the contrary, whether threats and pressures will erode its global position. The main objective of the present investigation is to analyze the role of the university within the changing world order of the 21st Century and for this purpose it is proposed to know the main changes that operate in the current international system, to decipher how these new global trends affect the university and, understand how the university is reacting to these systemic changes. To achieve these objectives, an extensive literature review has been carried out within the fields of International Studies, Education Sciences, and other Social Sciences. Finally, it is expected to obtain as a result some concrete answers about the context, the impact and the reactions of the university to the modified international system to contribute to a much broader, complex and necessary debate regarding the future of the university as a global actor in the new international system of the 21st Century.

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I. **Introduction**

From its remote and somewhat confused beginnings in the Eastern world, through the creation of the first institutions in medieval Europe, to the closest modern configuration, the university has always been a relevant actor within the international system. At the beginning of the 21st Century, the international system seems to be in transition and reconfiguration resulting in a modified world order. The end of the Cold War finished the bipolar scheme and has contributed to a period of profound change in the main systemic parameters of that order. In this new and convulsive international context, the university, which key features are being global in scope and historically interrelated with multiple actors at a national and international level, faces new and powerful challenges as an international actor.[1]

From the field of Educational Sciences and Social Sciences, there are many experts who approach and study the future role of the university within the changing international system. Mostly, these investigations are aimed at recognizing how the main changes that occur in the "international system" affect Higher Education and the university, as well as understanding the effects of the internationalization process that many universities have promoted in recent decades. Particularly, the field of study linked to Higher Education has made considerable efforts to analyze the role of the university on a global scale.[2] At the same time, from Philosophy and other Social Sciences such as Sociology or Economics, there have also been approaches

[1] To be considered an international actor, it is necessary to have the capacity to generate or participate in relationships that are intentionally significant for the entire international system (Dallanegra Pedraza, 2001, 2003).

[2] Cf. Sheila Slaughter and Larry Leslie, A*cademic capitalism: Politics, policies, and the entrepreneurial university* (Baltimore: Johns Hopkins University Press, 1997); Jürgen Enders and Oliver Fulton, *Higher Education in a Globalizing World: International Trends and Mutual Observation* (Dordrecht: Springer Science & Business Media, 2002); Roger King, *The University in the Global Age* (Basingstoke: Palgrave MacMillan, 2004); James Forest and Philip Altbach, *International Handbook of Higher Education* (Dordrecht: Springer, 2006); Philip Altbach, Liz Reisberg, and Laura Rumbley. "Tracking a global academic revolution." *Change* March/April (2010): 30-39.

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made to understand the role of the university and the influence of the international context in its traditional functions.[3] Along the same line, international organizations have also recently focused their research work on the intersection between higher education and international affairs because of the renewed interest in scientific knowledge and university training in the 21st Century world order.[4]

On the other hand, there are relatively few investigations carried out from the specific disciplinary field of International Studies on the role of the university as an international actor. The historical interest and focus of the international discipline on the role and performance of the Nation State as a central actor of the international system has meant a certain abandonment and neglect of other global actors and phenomena, among which are higher education and, particularly, the university. Of course, this does not mean that there are no researchers from International Studies working on these issues, but they have not had the means to a profound analysis of the role of the universities in the international context. Among the few "internationalists" who have addressed the phenomenon, the interest has focused on understanding the changes within the "international system" and the impact that this has for universities.[5] This paper tries to bring in innovative perspectives that address the role of the university from an International Studies viewpoint analyzing the mutual impact between international system and higher education institutions.

In the current international system, the university is facing many demands and challenges. As a result of that, the research problem that arises in this work focuses on studying whether this altered international stage will imply

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[3] Cf. Henry Etzkowitz and Loet Leydesdorff, *Universities and the global knowledge economy: a triple helix of university-industry-government relations* (London: Pinter, 1997); Zygmunt Bauman, *Liquid modernity* (Cambridge: Polity Press, 2000); Boaventura de Sousa Santos, *La Universidad en el Siglo XXI* (Buenos Aires: Laboratorio de Políticas Públicas y Miño y Davila, 2005); Manuel Castells, *Communication power* (NY: Oxford University Press, 2009); Daniel Innerarity, *La democracia del conocimiento* (Barcelona: Paidós, 2011).

[4] Cf. UNESCO, *2009 World Conference of Higher Education: the new dynamics of higher education and research transformation and development* (Final Report. 5 to 8 July 2009. Paris: UNESCO, 2009); UNESCO, *UNESCO Science Report: Towards 2030* (Paris: UNESCO Publishing, 2015); OECD, *Education at a Glance 2016: OECD Indicators* (Paris: OECD, 2016); WORLD SCIENCE FORUM, *Declaration of the 8th World Science Forum On Science For Peace* (Text adopted on 10 November 2017, Dead Sea, Jordan).

[5] Cf. Immanuel Wallerstein, *Geopolitics and Geoculture: Essays on the Changing World-System* (Cambridge: Cambridge University Press, 1991); Gilles Breton and Michael Lambert, *Universities and Globalization: private linkage, public trust* (Paris: UNESCO, 2003); Michael Horowitz and William White-Burke, "Academia can be an important vanguard of the Fourth Industrial Revolution", *World Economic Forum,* 19 Jan 2018.

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an opportunity for the university as an international actor to assume new roles on a global scale or if, on the contrary, threats, and pressures will besiege it erode its global position. The main objective of the present investigation is to analyze the role of the university within this changed world order of the 21st Century and for this purpose it is suggested to analyze the main changes that operate in the current international system, to decipher how these new global trends affect the university and, understand how the university is reacting to these systemic changes.

In terms of the methodology applied, a variety of sources are used for data collection and data analysis, which includes an extensive literature review within the disciplinary field of International Studies, Education Sciences and other Social Sciences.

Being aware of the breadth and complexity of the study phenomenon and the thematic, empirical, disciplinary and methodological limitations involved in a work of this caliber, the present research intends to contribute through a bibliographical study to encourage academic debate on the role of the university in the 21st Century that requires new and more complex investigations.

II. **University as a national and international actor**

Historically, the university has been an institution linked to a wide range of national and international actors at different levels, as well as a varied agenda of social, political, economic, educational, technological and cultural issues. In the field of International Studies, the university has played a significant role throughout history, not only as a natural responsible for the production, systematization, and transmission of science and knowledge but also mobilizing transborder activities of professors, researchers and students from all over the world.

For two centuries, the university has been able to coexist with the central actor in international relations: the Nation State. Although it has received strong pressure from the modern Nation States that sought to nationalize their functions and turn it into an instrument of internal homogenization, the university has been able to interact with the Nation State to sustain certain spaces of autonomy. Faced with the demands of the State, the university was obliged to provide a training education for the citizen that would make disciplinary specialists also worthy patriots who would defend national causes. As Enders points out:

> *The contemporary university was born of the nation-state, following the establishment of clear national economic interests. Their regulatory and funding context was, and still is, national; their contribution to national*

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> *cultures was and still is, significant, and universities played, and still play, a considerable role in what some have called the military-industrial complex of nation states. In this perspective, they are very much national institutions.*[6]

However, a tacit agreement between the State and the university was generated which allowed certain autonomy and certain privileges in exchange for providing knowledge and skilled personnel that would contribute to the economic and military development of the nation. This agreement allowed university to protect the perspective as universalist and international force (because this is the nature of knowledge) even though it provided essential services for national agents.

During the Cold War, the confrontation between the two global superpowers was settled in the field of ideologies and this meant that many Nation States pressured the university in their countries to play an active role in the indoctrination of individuals, institutions, and countries. In this context, the university had to *negotiate* again with those States certain margins of independence in exchange for not only being responsible for the transmission of prevailing political ideas but also participating strongly in the struggle for economic and scientific-technological development. The end of the Cold War eased the pressure of States, but, at the same time, it opened a new stage in the history of international relations where the university will be subjected to new demands and challenges.

Throughout its historical evolution as an international actor, the university has demonstrated a series of attributes that are its own and define it as such. These particularities explain, to a large extent, their historical actions and, at the same time, allow us to foresee their capacity to respond to the multiple challenges that must be faced in the current international system. Essentially, it is possible to identify three characteristics that define the university within the world concert:

1) *Traditional actor of scientific knowledge*
   Essentially, it is the institution that has the specific task of producing scientific knowledge and, therefore, what really defines the university nature is its historical role as a creator and transmitter of new knowledge. A pioneer in this field, John Henry Newman, has pointed out that the main purpose of the university is nursing "*knowledge*".[7] In

[6] Jürgen Enders, "Higher education, internationalization, and the nation-state: Recent developments and challenges to governance theory," *Higher Education* 47, no. 3 (2004): 364-365.

[7] Gary Rolfe, "Cardinal John Henry Newman and 'the ideal state and purpose of a university': nurse education, research and practice development for the twenty-first century," *Nursing Inquiry*. 19 (2012): 100.

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the same line, the French thinker, Foucault, believes that the university is a part of society that tries to respond to the will of humanity to understand the truth in all circumstances of life and the universe in which that lives.[8] Finally, Altbach complements this view by pointing out that the university is: "*the primary center of learning and reservoir of accumulated wisdom*".[9] Consequently, it is understood that the university has historically complied in the international system with the two central functions assigned to it: *producing knowledge* and *transferring knowledge,* which is *educating people*.

2) *Universal and international vocation*

Historically, the university has been characterized by an obvious universal vocation and an open promotion of the international. The nature of knowledge is universal and transcends national boundaries. Supported by these values, the university has always tried to develop technical and scientific progress that is transnational in scope. Therefore, it must be considered that the university has always been an internationalized institution where professors and students shared the most varied nationalities and where the mobility of international students was constant. Throughout history, many times universities have maintained contact even in the tensest moments of a relationship between States and in many others have been the first step in the reconstruction of a conflictive relationship through the signing of exchange agreements and scientific-technological cooperation. As Altbach points out, although there were other models of university institutional organization, the current universities become part of the medieval Western model, especially the one promoted by the University of Paris, which means that the organizational pattern of contemporary universities has a common tradition, which is the element of internationalization. Altbach sums it up by saying: "*There is an institution that has always been global and that continues to be a powerful force in the world after half a millennium. With its roots in medieval Europe, the modern university is the center of an international knowledge system that embraces technology, communication, and culture*".[10]

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[8] Michel Foucault, *The archeology of knowledge* (New York: Pantheon Books, 1972): 227.

[9] Philip Altbach, "Perspectiva comparada para la educación superior en el Siglo XXI," *Revista Pensamiento Universitario,* Año 6, Nro. 8 (1999): 3.

[10] Altbach, "Perspectiva comparada para la educación superior en el Siglo XXI," 3.

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3) *Adaptation capacity*

The flexibility and ability to adapt to the innumerable political, social, economic and cultural changes are the elements that allow us to understand one of the keys to the thousand-year-old global existence of the university. Throughout its history, the university has shown an enormous ability to adapt to new contexts, actors and phenomena in the international system. Precisely, these qualities are what have allowed it to become one of the most long-lived international actors and, at the same time, most relevant to the global concert, maintaining its traditional role as an actor in charge of generating and transmitting scientific knowledge. The perdurability of the university as a historical and global institution within the international system comparing with other actors is evident. Its durability is confirmed by discovering that among all kinds of institutions that were established in the Western world by the year 1520, only 85 still survive today, including the Catholic Church, the British Parliament, some Swiss cantons and more than 70 universities.[11]'[12] As Sporn concludes: "*Universities have become the oldest type of organization in the world, surviving turbulent periods and epochs with different values, beliefs, and cultural norms. This suggests that his administration and governance have unique characteristics that allowed him to adapt to all the environmental changes that he has had to live*".[13]

Essentially, the existence of the university for centuries as an actor of the international system has been associated with its role as the main producer and transmitter of scientific knowledge; its universal and global vocation; and its flexibility and ability to adapt to new times and contexts.

III. **New international context**

In the last decades of the 20th Century, the world entered a vertiginous path of transformation, driven by multiple and profound global processes

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[11] Clark Kerr, *The Uses of the University* (Cambridge: Harvard University Press, 2001), 115.

[12] Among other examples, the University of Salamanca celebrated its 800th anniversary in 2018.

[13] Barbara Sporn, "Governance and Administration: Organizational and structural trends," in *International Handbook of Higher Education,* ed. James Forest and Philip Altbach. (Chapter 9. Volume 18. Dordrecht: Springer, 2006), 141.

that, in parallel, have been operating within the world order and have generated very significant changes throughout the international system: the transition from the Cold War to a new international order; changes in the capitalist economic system; a scientific and technological revolution; the globalization and the erosion in the role of Nation-States. This new context implies substantial changes in the international system, which have generated (and continue to do so) a structural transformation of the political, economic, social, technological, educational and cultural spheres that are shaping a new configuration of the world order of the 21st Century.

It is possible to consider the current configuration of the international system as a structure in transition, from an old and simplified bipolar scheme typical of the Cold War towards a new, more polarized and complex international order. The international system is going through a stage of *intersystem transition*,[14] characterized, mainly, by the speed, magnitude, and complexity of the change. While this transition within the current international system is a slow historical process and still in progress, it is equally possible to analyze some essential *systemic parameters*[15] that allow describing the main changes and identify some initial characteristics of the new global order where the university could play an important role.

1) *Actors*

The first of the elements to be considered are the main actors that participate in global dynamics. In the current international order, it is possible to identify a wide range of actors that have very different characteristics according to their number, power, function, and interests. The international post-Cold War system has opened a new scenario where traditional actors of international relations coexist alongside new actors who acquire notoriety and where the Nation State is forced to interact with non-state actors that demonstrate a renewed interest. All these actors coexist in a disordered situation and are highly interdependent among themselves, which allows to foresee a reordering and rebalancing of the international system. In this sense, it is foreseeable that new polarization processes will take place where new actors (States and non-States) acquire relevance and

[14] The process of "intersystem transition" is called: "*the stage that mediates between the "decadence "of a system and the" emergence "of a new one*" (Dallanegra Pedraza, 2001, 2003).

[15] The "systemic parameters" are all those elements and constituent parts of the international system (actors, relationships, processes, topics, etc.) that play a central role in determining the final configuration adopted by the world order.

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global power, while others lose their strength.[16] Some of these new international actors began to challenge the traditional role of intermediation of the higher education institutions because they aspire to participate and link directly with scientific knowledge through their own production, transmission, and application.

2) *Relationships*

The second component to analyze in the current global context are the interactions and relationships that are generated between the different actors within the international system. The acceleration of phenomena such as globalization and the scientific-technological revolution and the presence of more international actors forming part of the international order are some of the factors that are shaping a new global structure where the interactions and relationships between the different actors shape new types and greater number of connections. The traditional interactions and relations between states (mostly bilateral) have given way to a new international scenario with a greater number of actors (both state and non-state) that make a greater number of linkages (multilateral, regional, international, transnational, etc.). This acceleration and intensification of the interactions and relations between the different actors are consolidating conflicting and asymmetric links, but, at the same time, increasing cooperative and competitive interrelationships between universities and a large variety of international stakeholders.[17]

3) *Topics*

The end of the bipolar order allowed the emergence of topics that were displaced or subordinated by security and defense issues and in the current international system, they have become much more relevant, which prompted the establishment of a new global agenda of topics characterized by being much more diversified, extensive and interdependent than the previous. Among the new issues that have become relevant are environmental issues, poverty, social inequalities, migration, global governance, or financial volatility. Higher Education, the training of skilled personnel, and the transmission of scientific knowledge to future employees and

[16] Essentially, "polarization" is a very dynamic process by which the main actors of the international system struggle and compete seeking to establish balances of power in the system.

[17] Since the end of the seventies, Robert Keohane and Joseph Nye (1977), began to describe the emergence of a new international system characterized, precisely, by the existence of new non-state actors interested in global affairs and the acceleration of intensification of contacts between them, which was generating a new context of "*complex interdependence*".

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citizens have claimed in the top of the agenda of topics in the international system.

4) *Processes*

Finally, a set of international processes that profoundly affect the totality of international reality and its most essential parameters (political, economic, technological and social) have arisen in a disorderly, interdependent and overlapping manner. Within this new international context, some systemic processes are affecting especially the functions and roles that the university has historically had. The following stand out among them:

i. Transition to a new ordering of the international system

The culmination of the Cold War has assumed the exhaustion of the bipolar international order that extended from the end of the Second World War until the definitive dissolution of the communist bloc in 1991. The central issue in this process is the magnitude of the change produced by the transition to a new ordering of the international system. The fall of the bipolar structure supposes, at least, three main consequences on the international configuration of post-Cold War: a) the collapse of one of the superpowers (the Soviet Union) leaves the United States as the main actor of the international system a single political and economic referent, but also supposes the emergence of new poles that aspire to balance the power of the hegemon (China, India, European Union, etc.); b) the end of an international agenda of topics marked by military issues that gives space to the treatment of new topics; c) the end of the strategic alignments in a bipolar key and the disciplined subordination of the actors to one of the antagonistic blocks. The new international order of the 21st Century is changing dramatically, and it could open numerous opportunities for universities.

ii. Erosion of the Nation State

The second process of special relevance generated within the international system in recent decades is the erosion of the traditional role of the Nation-State and the consequent changes in the international political order. The Nation State has begun to lose power and influence within the world order because of a confluence of factors: a) growth of the influence of the communication, information and finance sectors that operate over the borders of the Nation-State, and b) by the increase of local and subnational identities. As a result, questions have been raised

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about the continuity of the Westphalian Order and, for the first time in hundreds of years, the Nation State feels its position as a central actor of the international system threatened, which necessarily implies a change in the international political order.[18] This erosion of the Nation State has, at least, two visible impacts on the university: on the one hand, the increases of the number of international non-state actors with a hegemonic vocation that rival the university; and, on the other hand, the Nation State has begun to reduce national budgets for universities leaving part of this task in private hands.[19]

iii. Changes in the capitalist economic system

Another process within the international system to consider is linked to changes in the capitalist economic system. The supremacy of the capitalism throughout the 20th Century has only been possible thanks to the fact that, throughout its historical evolution as an economic model, it has mutated, reconverted and reconfigured several times to maintain itself in force. One of the most important changes occurred at the beginning of the 1970s when the economic guidelines established at Bretton Woods were modified towards a mode of subordination of domestic economies to the demands of the global economy. From then on, the formation of an international economy characterized by the globalization of production and finance thanks to the use of new technologies became increasingly evident. These changes in the economic system began a new stage of capitalism that was transformed into an essentially *post-industrial* and *post-Fordist economy*, which meant the change from a production system based on the industry governed by corporations, unions and state regulation to the production of management without industry (in terms of territorial location) and without regulation, constituted by the actions of companies and the competition between them. The economy is increasingly outsourced, focused on the intensive use of intellectual capital, increasingly globalized and much more flexible and mobile thanks to the use of the new Information and Communication Technologies (ICTs). In this context, scientific

[18] The "Westphalian Order" refers to the system of political organization based on the principles of territoriality and sovereignty of the Nation State that has remained in force for the last 350 years in the international system.

[19] UNESCO, *UNESCO Science Report: Towards 2030*, 41.

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knowledge has been revalued as a key input for market innovation, which places the university in a strategic position as a traditional international actor in the production and transmission of knowledge. In the capitalist economic system of the 21st Century, the generation of knowledge and the qualification of human resources become essential economic tasks.

iv. Scientific-Technological Revolution

The spectacular scientific and technological development of the last decades is generating the impression of living one of those key moments in the history of humanity. It is a revolution that affects the very foundations of the system and that, at the hands of an unparalleled scientific-technological development, is modifying each aspect of our life. The expression Scientific-Technological Revolution refers to the phenomenon of technical transformations and their economic and social implications that have occurred within the international system since the last quarter of the 20th Century up to the present. The speed and depth of the intensive application of new technology to numerous areas of daily life make it difficult to assess the impact that all these changes are generating on society. Therefore, it is possible to describe some of the most visible transformations: a) the enormous range of possibilities for research and development in new areas of knowledge; b) the emergence of new industries and sectors of goods and services; c) the dematerialization of manufacturing and commerce; d) the elimination of barriers to the cross-border circulation of goods, services and capital; and, e) changes in referents of time and space that are totally discarded in the traditional way. According to Schwab "*These new technologies have the potential to change the course of history and affect every aspect of our lives*".[20] The application of technology to the treatment of information and communications has a strong impact on universities and is forcing them to modify and adapt a large part of their activities. The rapid scientific-technological development of recent years has forced the university to make quick decisions due to the impact that these changes are having on teaching, on research, on the development of a new virtual market and by the emergence of new actors-competitors, among others.

[20] Klaus Schwab, *The Fourth Industrial Revolution* (New York: Crown Business, 2016), 2.

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v. Globalization

The analysis of the current international context would not be understood without taking globalization into account as one of the most recognized processes in the current global context. It is a phenomenon of multi-causal origin, of enormous proportions and with unpredictable consequences for the entire international system. During the first half of the 1990s, and despite the imprecision of the new world context that was beginning to emerge, a consensus gradually emerged that globalization was a key factor in the transformations that the international system was undergoing. This is what David Held (2000) defined as the "*expansion, deepening and acceleration of the global interconnection in all aspects of contemporary social life*". A more interconnected and interrelated world, at least in some areas (in economic, financial and communication terms), and in some specific geographic coordinates (developed countries). Regardless of the position taken on the controversial phenomenon that globalization entails, what is certain is that its effects are permeating the new world reality and, especially, are spreading in the field of action of higher education and the university. As Knight points out, the result of this whole process draws a new scenario for higher education institutions with very particular characteristics: a) the use of English as a lingua franca of scientific communication; b) the growth of the international labor market for professors, researchers and students; c) the use of new technologies for better communication and exchange of data, the selection of personnel, the dissemination of scientific knowledge; d) the generation of research networks, and also e) the realization of academic programs of virtual learning. As Knight summarizes: "*Globalization must be understood as a key contextual factor that has multiple effects, both positive and negative, in the field of education*".[21]

vi. Beginning of the Knowledge Society

Finally, in this convulsive context of the beginning of the 21st Century, knowledge and science acquire special and strategic relevance as a global agenda topic. The role observed is playing scientific knowledge in the current stage of the international

[21] Jane Knight, "Internationalization: Concepts, Complexities and Challenges," in *International Handbook of Higher Education*, ed. James Forest and Philip Altbach (Chapter 11. Volume 18. Dordrecht: Springer, 2006), 207-227.

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system has overflowed the strictly economic scope to transfer to the rest of society generating an extensive and powerful impact in all spheres. In this context, the phenomenon of the Knowledge Society refers to a new type of society characterized by the intensive application of knowledge in all the orders of life and where knowledge becomes the main source of production, wealth and power. The emergence of the Knowledge Society is a global process that will not totally replace the old Industrial Society but will coexist in a range of heterogeneous situations during a long period of transition. Everything presumes that the road to a true Knowledge Society will be a slow, complex, heterogeneous and conflictive process, which will depend, in large part, on the ability of the actors to extend the benefits of the new era of knowledge to the whole international society. In this context, the university, as a traditional actor of knowledge, can occupy a very prominent role in the future international system.

IV. **Impact and challenges for the university**

The profound changes that have taken place in the international system of the 21st Century are having important consequences and impacts on the university. The ability of survival and the adaptability that the university has shown throughout its history are its main strengths to face a changing international context where new actors and interests have begun to challenge the university in its traditional functions. King describes the new international context that awaits the university by stating that: "*the decline of sovereignty and influence of the territorial states, and the growth of international and supranational jurisdiction, alongside the increased globalization of world economy, also heralds, if not the end of the University, then its profound transformation*".[22]

In the world order of the 21st Century, so uncertain, changing and complex, the university will have many obstacles to face. Among them, it is possible to identify, at least, five main challenges:

1) *The proliferation of new international actors challenging the role of the university*

The first of the challenges that the university must face, in the current international system, is the proliferation of new international

[22] Roger King, "The contemporary University," in *The University in the Global Age,* ed. Roger King (Chapter 1. Basingstoke: Palgrave MacMillan, 2004), 1-2.

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actors that aspire to participate and link directly with scientific knowledge through their own production, transmission, and application. This is what de Sousa Santos calls the "*crisis of hegemony*"[23] of the university, which means to stop being the only actor in the field of Higher Education and in the production of scientific research due to the appearance of new competitors who perform the same functions as during centuries were almost exclusively the university's task. In this sense, it is almost unanimous among experts the consideration that the new international context is working against the traditional monopoly held by the university in the creation, management, and transmission of scientific knowledge due, among other things, to the increase in the number of actor's international organizations interested in linking directly with knowledge. Actors such as Companies, Intergovernmental Organizations, Non-Governmental Organizations, Think Tanks, Epistemic Communities or Scientific Diasporas have become virtual competitors of the university. Due to this, thinkers such as Wallerstein openly raise their doubts about the future of the university asking whether in the next fifty years the university will continue to be the main organizational basis of academic research or other structures (research institutes, center of advanced studies, epistemic communities, companies, etc.) will replace it.[24] Given this scenario, many experts are already beginning to proclaim a new international context "*polycentric of knowledge*"[25] or "*pluricentric*"[26] where the university must share roles and functions with new actors.

2) *Get wider margins of autonomy and independence*

The second challenge facing the university within the new international system is to maintain certain margins of autonomy and independence. What de Sousa Santos calls "*institutional crisis*" is the growing pressure to which the university is subjected to adapt to criteria of efficiency and productivity of a corporate nature or social responsibility. The revaluation of Science, Technology, and Innovation as a strategic resource is increasing the attention and interest of the

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[23] de Sousa Santos, *La Universidad en el Siglo XXI. Para una reforma democrática y emancipadora de la Universidad,* 12.

[24] Immanuel Wallerstein (coord.), *Open the Social Sciences: Report of the Gulbenkian Commission on the Restructuring of the Social Sciences* (Stanford: Stanford University Press, 1996).

[25] Daniel Innerarity, *La democracia del conocimiento. Por una sociedad inteligente*, 61.

[26] Oliver Todt, "La gobernanza tecnocientífica en la Unión Europea," *Revista CTS,* Vol. 3, Nº 7, (Septiembre 2006): 24.

environment (economic, political and social) on scientific knowledge and is increasing the demands and pressures on the university itself. Breton describes this situation very well when he points out that: "*Universities are now subsumed to the economy and the market, losing the autonomy that they enjoyed at other times, to join knowledge production networks in which the academic decisions begin to be taken from other motivations*".[27] Even areas that seem to be far from the university context, such as the strategic-military or the ecological one, begin to pressure the university in search of specific solutions for their own conjunctural problems and challenges. Most of the current debates, both academic and non-academic, point out the need for the university to articulate its functioning with other international actors (State, Company, International Organization, etc.) to achieve greater economic, political and social development. These new ways of connecting and articulating new actors with the university do not cease to be a serious threat to the autonomy in the functioning of the universities. According to Altbach and Knight, universities are now more closely linked than ever to the practical needs of society dictated by governments (for public institutions) and the market (for public and private institutions), which means that the pendulum has too decanted towards the government and the market, at the expense of the traditional autonomy of the academic world.[28]

3) *Assignment of new roles and functions*

The third challenge that higher education institutions must face is the assignment of new roles and functions. Historically, the university has complied with the two central functions assigned to it: *generating scientific knowledge* and *educating people*. However, now, the university is being subjected to strong pressures both from the environment and in its interior to deepen some of its old roles and, at the same time, assume new functions within the international system of the 21st Century. In this regard, it is possible to identify at least three systemic demands.

First, amid global changes and emerging tensions, the university is now under pressure to expand and deepen its role as the main actor in the task of educating people and instructing future professionals. This is an activity that the university has historically carried out, but which

[27] Breton and Lambert, *Universities and Globalization: private linkage, public trust*.

[28] Philip Altbach and Jane Knight, "The Internationalization of Higher Education: Motivation and Realities," *Journal of Studies in International Education,* 11 (2007): 290-304.

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now acquires greater importance due to the revaluation of knowledge and the qualification of personnel for the economic system. Currently, the most important function of the university is to produce well-trained and highly mobile skilled workers who can act as vehicles for the transfer of technical and scientific knowledge. The work of reproduction of highly skilled personnel becomes one of the central activities for the new Knowledge Society since these qualified workers will be responsible for tasks related to the creation of knowledge through research, both in the public sphere as private; they will be responsible for the transmission and reproduction of tacit knowledge through teaching; and, they will also manage the transfer of knowledge to the productive sector to turn knowledge into innovation.[29]

Second, the university is being pushed to become a new source of scientific and technical solutions to the multiple global challenges that humanity must face. There is a consensus today that no other actor is in a better position than the university itself, given its history, nature, and objectives linked to scientific knowledge, to be able to respond to the complex international agenda that must be faced in the 21st Century. The need for scientific knowledge to be used as a tool to solve the global challenges in the current historical moment, which transcends national borders, is frequently raised from some political, economic, social and academic areas. In this sense, the university is understood as the most useful and effective instrument in the search for concrete solutions to the global threats that the international agenda of topics present today (environmental problems, energy, poverty, inequalities, massive movement of people, public health issues, etc.) through the creative application of scientific knowledge for the solution of general problems.

Finally, the university is also assigned a role linked to the need to share the result of its tasks with other social actors through specific applications and, especially, by transferring its research to the productive sector as a way of contributing to the economic and social development. Universities are being subjected to strong external pressures to expand their role and extend their links outside the traditional academic environment because it is understood that the role of universities is especially strategic in the new global context.

[29] Innovation is understood as a process of creating economic value through which certain products or production processes are effectively introduced into markets (OECD and Eurostat, 2006).

This is the origin of the so-called "Third Mission" of the university, for which it must fulfill a new function in the Knowledge Economy and Knowledge Society linked to contribute to economic and social development through the production and transfer of knowledge-based innovations. This function is added to the two performed by the traditional Humboldt university of teaching and research.

4) *Extension and naturalization of competitive logic*

A fourth challenge comes from the entrance of the university into the competitive logic of the capitalist economic system. In the current international context, universities represent a fundamental resource in the new Knowledge Society because they are a key element as centers of training, creativity, innovation, entrepreneurship, transfer, and attraction of investments and talents. As a result of this revaluation, it is not surprising that the university centers have also entered the competitive logic that characterizes the world capitalist system. Therefore, now universities have become global actors that, increasingly, compete to attract funds, professors, researchers and students because the reputation of a university is now built internationally which means competing with other institutions at local, regional and global level.

Competition between universities has been institutionalized within the global market thanks to the accreditation systems (ISO quality mark) and evaluation (hierarchy of results) made by public and private agencies at different scales. The most visible aspect of competitive internationalization is the recent appearance of world university rankings, which represent one of the most evident effects of academic globalization. These rankings demonstrate explicitly the competitiveness of a university through the comparison with their peers on a series of criteria that are normally linked with the infrastructure, the academic offer, the teaching quality, the research prestige and the scientific production in publications and patents, among other indicators.[30]

The extension and naturalization of competitive logic among higher education institutions is a controversial phenomenon for many experts who show discrepancies about the consequences of this open

[30] Although numerous university rankings have proliferated, the three most renowned and most influential are: i) the Annual Academic Ranking of World Universities (ARWU) published by the Institute of Higher Education of the Jiao Tong University of Shanghai (UJTS) in China; ii) the Academic Ranking of World Universities, of the Times Higher Education Supplement (THES) of London; and, finally, iii) the Quacquarelli Symonds (QS) World University, published by the British company Quacquarelli Symonds.

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competition. For some intellectuals, the entrance of the university into commercial and competitive logic directly attacks the very nature of university activity and can only be understood within the framework of a process of commercialization of scientific knowledge. In this line, de Sousa Santos points out the existence of a neoliberal project in the medium and long-term, which includes different levels and forms of commercialization of the university based on two pillars: the reduction of investment of the Nation-State in the public university and the commercial globalization of the university. The final objective of this process is none other than the transnationalization of the university educational services market.[31] On the contrary, for other specialists, this competition is necessary and beneficial for the university. Quintanilla, for example, criticizes those who understand the competitive logic of universities as an imposition of the capitalist system and believes that competition can bring out the best in universities, scientists and students: "*Even if we had a social economy instead of a capitalist one, it would continue to be necessary, in order to guarantee the progress of science and technology and, consequently, the increase in the well-being of the population, that European universities compete among themselves for being better and better, or for attract the best scientists and students*".[32]

5) *Increasing unequal geopolitical distribution among universities*

A final challenge is represented by the increasing inequality in the geopolitical distribution of universities within the international system, which is generating the intensification of the knowledge and scientific gap, as well as the deepening of the processes of "centrality and marginalization" of universities at international level.

In the new international system, universities are distributed and concentrated in a small number of global institutions, called *World Class Universities*, which are those that occupy the top positions in the rankings and have the best professors, researchers, and students. Currently, international rankings reveal a geographical distribution of such universities in just over ten countries, with a special concentration in the United States (between 50% and 60%).

The block of Anglo-Western universities (United States, United Kingdom, Australia, and Canada) and the rest of Western Europe,

[31] de Sousa Santos, *La Universidad en el Siglo XXI. Para una reforma democrática y emancipadora de la Universidad*, 16.

[32] Miguel Quintanilla, "La investigación en la sociedad del conocimiento." *Revista CTS* Vol. 3, núm. 8, abril (2007):186.

cover 93% of the universities that are among the first 100 places in the world rankings. At the same time, the same countries attract 8 out of 10 international students of Higher Education and host 90% of the top 500.[33'34] Despite the fact that universities are growing fast in South East Asia, especially in China, Singapore or Japan, still the best universities of the world are concentrated in few occidental countries, and the gap between developed and poorest countries is becoming worst. As Altbach, Reisberg and Rumbley have confirmed: "*the inequalities among nations' higher education systems has increased in the last 10 years*".[35]

These differences are notable at the international level where the *central countries* benefit from the production of scientific knowledge, while the *peripheral countries* are deprived of access to primordial cognitive goods on transcendental topics such as new medical, agricultural or educational material. The cognitive gap (Knowledge Divide) and the scientific gap are evident between the countries of the North and those of the South, but it also manifests itself internally in each society. The emergence of this gap has led UNESCO to rise, with great concern, whether the world is heading towards a dissociated society where knowledge is distributed unequally: "*There is a real scientific gap that separates" science-rich "countries from others. The vocation of science is universal, but scientific advances seem to be the exclusive part of the planet. Several regions of the world suffer in this area from a considerable delay, which hinders the development of research*".[36]

This phenomenon is having an immense impact on the way science and knowledge are distributed on a global scale and in the way that it affects and deepens other previously existing social gaps. While, on one hand, it is thought that the discoveries and scientific-technological applications generated in the university can bring enormous social benefits helping to combat great challenges of humanity, on the other hand, there is concern about the unequal way in which it is distributed and the consequences that it will have in the future. Undoubtedly, open

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[33] Jose Brunner, "Globalización de la Educación Superior: Critica de su figura ideological." *RIES, Revista Iberoamericana de Educación Superior* (2010): 77.

[34] Shanghai Ranking Consultancy. The 2017 Academic Ranking Of World Universities. 2017.

[35] Philip Altbach, Liz Reisberg, and Laura Rumbley. "Tracking a global academic revolution." *Change* March/April (2010): 33.

[36] UNESCO, *Towards Knowledge Societies. UNESCO World Report*, 183.

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inequality has important social, political, economic and educational consequences, and represents one of the most important challenges of the university in the international system.

V. **Reconfiguration and adaptation**

The new international context of changes and transition in which the university is inserted and the demands and challenges it faces have forced the university to take quick decisions to successfully adapt to the renewed global framework. As Arimoto mentions: "*Unless the university responds to the internal and external criticisms and pressures by carrying out thorough reforms, it will be impossible to build universities that can meet the needs of the new era*".[37] For this, the university has had to rethink its interests as an organization and initiate a process of reconfiguration appealing to its historical flexibility, adaptability and international vocation as main strategies.

Considering this new global context, the university has begun to implement a series of strategic actions with the express purpose of adapting as soon and as well as possible to the new international context. Among the main strategies it is possible to highlight the following:

1) *Looking for new funding sources*
   Confronted with growing number of students and reduction of funding, the university has begun to look for new funding sources that allow it to continue functioning as a central actor in the production and transmission of scientific knowledge. Since the seventies, although much more accelerated in recent decades, many universities have seen their public budgets reduced, which has threatened the very sustenance of the institutions and forced them to seek alternative financing to survive. Therefore, the university has begun to develop strategies that include the privatization and commercialization of the products and services that higher education generates and that it can offer to the market. This is what Slaughter and Leslie have called *Academic Capitalism*[38] and represents the use that universities make

[37] Akira Arimoto, "Globalisation and Higher Education Reforms: The Japanese Case" In *Higher Education in a Globalizing World Higher Education Dynamics*, ed. Jürgen Enders and Oliver Fulton (Vol 1, Springer, Dordrecht, 2002), 127.

[38] Slaughter and Leslie, *Academic capitalism: Politics, policies, and the entrepreneurial university*.

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of their only real asset, the human capital of their academics and the scientific knowledge generated by them, to increase their income.

2) *Internal reconfiguration*

The university has also initiated a strategic process of internal restructuring in the search for higher levels of efficiency and modernization that will allow it to face the multiple challenges to which it is subjected. In this sense, it is possible to identify four main areas where substantial changes are observed.

Firstly, in the *administration*, new forms of management specific to the field of business have been incorporated. Many universities, especially public institutions, have developed internal bureaucracies over time, similar in many cases to state machinery that assume a central role in the daily management of the organization with their own interests and wills. What is at issue now is to reconfigure these administrations to make them more efficient and productive with the aim of being able to compete with other educational institutions and with other international actors interested in knowledge.

Secondly, in the *academic staff*, there has also been a reconfiguration of strategies with the aim of achieving an academic offer and a product more attractive to the needs of the higher education market. Among the multiple actions that are carried out, the following stand out: a) strengthen and adapt the academic offer to the new socioeconomic realities; b) increase the profile and international reputation in order to attract the most brilliant professors, researchers and students; c) stimulate the arrival of funding sources; d) increase the quality of education to offer a better academic offer; e) diversify their students, faculty, and staff, to show intercultural skills and competencies; f) establish networks and strategic alliances with international actors; and, g) link with actors from their local environment to establish cooperative ties.[39]

Thirdly, in the *research* area, projects and research developments have been diverted to those scientific areas where there is greater interest on the part of the new funding sources. Because public funds for research have decreased in recent years, much of the applied research has turned to the search for private funds, which demand greater attention and focus on scientific areas that generate innovations

[39] Jane Knight, "Internationalization: Concepts, Complexities and Challenges," in *International Handbook of Higher Education,* ed. James Forest and Philip Altbach (Chapter 11. Volume 18. Dordrecht: Springer, 2006): 207-227

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applicable to the market. However, the main source for fundamental research is still provided by the university.

Lastly, in its own *infrastructure*, there is a strong commitment to expand and modernize its building facilities. The development of infrastructures fulfills a double objective: on the one hand, new and modern infrastructures have a key role in the production of new knowledge and in the attraction of prestigious professors and researchers; and, on the other, because competitive logic forces universities to offer their academic product to the market in the best possible way, and that includes new generation infrastructures.

3) *Encouraging interuniversity cooperation*

The new global context has allowed and stimulated the cooperative links among higher education institutions. Essentially, the phenomenon of interuniversity cooperation refers to the interaction and horizontal collaboration between universities. This phenomenon is not new and has been part of the work of many universities for centuries, however, at present, with more space for own initiatives, universities are using this strategy to expand their links, boost their autonomy and improve their positioning in the international system.[40]

The main foundation of the international cooperation of the universities is based on the collaboration and complementarity of their capacities for the realization of joint activities and the achievement of common interests and benefits. The university has found in mutual cooperation an excellent mechanism to obtain shared benefits in very varied topics, such as the institutional organization, establishing agreements on administrative management policy; strengthening and institutional projection at the national, regional and international levels; the improvement of the educational offer of degree, postgraduate, continuous and online, through joint programs; the training and specialization of researchers and scientific research processes; and, the increase of the extension and transfer of scientific and technological knowledge to other social actors. Among the main lines of action, Beneitone et al highlight four main sectors: i) student mobility; ii) the mobility of professors and researchers; iii) the formation of networks and joint academic programs; and iv) the coordination and internationalization of the academic curriculum.

[40] Altbach, Reisberg, and Rumbley. "Tracking a global academic revolution.", 33.

This new model sees cooperation as a key aspect of institutional development and the process of cooperation of the university that is now carried out through bilateral and multilateral agreements, such as networks or consortiums.[41] Interuniversity cooperation has become a strategy and an instrument of great value for universities if they want to survive the new global dynamics of the 21st Century. As pointed out by Moreno Alegre and Albáizar Fernández:

> *Universities increasingly seek strategic alliances and interuniversity cooperation formulas (networks, associations, consortiums, societies) that give them a greater ability to attract and retain talent (both of students and professors), a more prominent international presence, a better use of resources and, ultimately, a greater ability to compete in an increasingly demanding national and international panorama increasingly demanding.*[42]

4) *Boosting internationalization*

The new context of boom of the globalization has led the university to promote internationalization as a strategy to adapt to the new global system. Considering its historic universal and international vocation, it is not strange that the university is promoting internationalization as a strategy to successfully face the new global context. In the words of Beneitone et al: "*University internationalization is the transformative response of the academic world to globalization*".[43] The university has found in the internationalization a very useful tool to link harmoniously and strategically with other actors and, at the same time, strengthen its position within the international system.

The intensification of the internationalization processes of the university opens the doors to a new scenario for the university where it interacts with a greater variety of international actors (states and non-states) with which it establishes a greater number and modality of interactions. The rise in these relationships has increased the complexity of the links (cooperation, conflict, competition, hegemony) and, at the same time, stimulated the emergence of new processes and

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[41] Jesús Sebastián, *Cooperación e internacionalización de las universidades* (Buenos Aires: Biblos, 2004)

[42] Juan Manuel Moreno Alegre and Alfredo Albáizar Fernández, "La tercera misión de la Universidad," in *Libro Blanco de la Universidad Digital 2010,* ed. Jaime Laviña Orueta and Laura Mengual Pavón (Madrid: Fundación Telefónica, 2008), 91.

[43] Pablo Beneitone et al., eds. *Reflection on and Outlook for Higher Education in Latin America*. (Bilbao: University of Deusto – University of Groningen, 2007), 12.

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phenomena at the global level (knowledge governance, scientific gap, educational innovations, etc.).

The cooperation of the university with other international actors is not something new, but, in recent years, it has been extended and intensified. The links of the university with the States and companies have become one of the cooperative relations that have deepened more as a product of the new interpretations that consider that the production of knowledge and innovation are a direct consequence of the interactions between those actors. Increasingly, countries and regions choose to establish public policies aimed at articulating and coordinating the tasks of these three actors with the goal of stimulating economic and social development. These new interactions of the university with the State and the company are framed under the new knowledge production model called *Triple Helix*.[44] The key here is to stimulate cooperation and the complementary link among the actors with the aim of developing more and better scientific knowledge through a process that benefits all parties equally (*win-win situation*). This cooperative strategy with central actors of the world order supposes for the university to assume a more protagonist role and to be linked as a pair with the other two central actors of the international system: States and Companies. The university contributes with researchers, expert knowledge, infrastructures and laboratories and in exchange receives subsidies from the State and funds from the Companies to expand the production of new knowledge.

5) *The revolution of online education*

Finally, a new adaptation and reconfiguration strategy for universities has arisen because of the scientific-technological advances of the digital information and communication media. This is the rise of e-learning that is transforming the traditional teaching-learning process and that promises to completely revolutionize the educational field.[45]

In recent years, the university has begun to use the new digital tools through a wide range of possibilities and modalities: from courses that use websites only as a complement to traditional face-to-face education,

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[44] Henry Etzkowitz and Loet Leydesdorff, *Universities and the global knowledge economy: a triple helix of university-industry-government relations*.

[45] The concept of e-learning or online education is understood as: "*the use of information and communication technologies to improve and support learning in tertiary education*" (OECD, 2007).

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through blended courses that have teaching methods based on different interactions on the internet (blended learning), up to the offer of teaching completely online. In this context of online education boom Massive Open Online Courses (MOOCs) are creating great expectations.[46] Many universities, some of them considered World-Class, have started to offer courses on online platforms, allowing students from anywhere in the world to access them for free or for a very small amount of money. Since 2011, MOOCs have experienced exponential growth both in the offer of courses and in the interest of students. Currently, 800 universities around the world offer nearly 9400 online courses.[47]

The development of MOOCs and the growth of online education in recent years are presented as new global strategies of the university to strengthen its role as a transmitter of knowledge. Although the challenges that lie ahead are multiple and complex (quality control, financial viability, global connectivity, professor role, etc.) the possibilities offered by this new modality using new digital technologies have the potential to democratize teaching reaching more places and more people around the planet, which can represent a true educational revolution in the 21st Century.

VI. **Conclusion**

The university has occupied a relevant space as a global actor within the international system in recent centuries. Although many times its role and influence have gone unnoticed, even for analysts and researchers, its durability and its strategic role as a producer and transmitter of scientific knowledge has positioned it as one of the main actors in the international system.

Since the last decades of the 20th Century, the world has entered a vertiginous path of transformation, driven by multiple and profound global processes that, in parallel, have been operating within the world order and have generated very significant changes in all parameters of the international system (new actors, interactions, processes and global agenda of topics).

These strong changes in the world order at the beginning of the 21st Century confront the university to new and powerful challenges because of

[46] The acronym MOOC was coined in 2008 by Dave Comier and Bryan Alexander to refer to a new type of courses that are online (taught through the internet), open (anyone with internet access can participate) and mass (no limit of registration).

[47] Dhawal Shah, "By The Numbers: MOOCS in 2017", *Class central*, January 2018.

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the impact that those global changes are having on the university are multiple and profound: new actors that threaten their traditional role; reduction of their margins of autonomy; assignment of new roles and functions; insertion in the competitive logic, and the increase in inequalities between universities.

Faced with this convulsive context, the university has not remained immobile but, on the contrary, has begun an important process of reconfiguration and adaptation to the new times through multiple strategies of action. These include the search for new sources of financing, the promotion of internationalization processes, the use of interuniversity cooperation as a growth mechanism, the use of new technologies through online education and a profound process of internal reconfiguration that allows it to adapt to the new international context. All these actions have the same strategic objective: to improve the adaptation and positioning of universities in the new international system of the 21st Century.

Historically, transitions from one international order to another have meant a rebalancing of systemic power, and the rise and fall of different actors within the world order. For that reason, the international system of the 21st Century opens new questions about the future of the university as an international actor: the main dilemma remains whether this new stage will mean an opportunity for the university to assume new and relevant functions at international level, or if, on the contrary, it will be besieged by threats and pressures that erode its global role.

Any response to these challenges seems to be hasty, however, and as it emerges due to this investigation, despite the deep systemic changes that operate in the current order, and the strong impact of those trends on higher education, the university has begun complex processes of reconfiguration and adaption to the new international system seeking to become one of the most relevant actor in the new international system of the 21st Century.

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Editors' Acknowledgments

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Guidelines for Authors

Guidelines for Authors

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General Information

Tuning Journal for Higher Education, TJHE, is a joint academic publication of the University of Deusto (Spain) and the University of Groningen (Netherlands). It is published by the University of Deusto on behalf of the two institutions. It appears twice a year, in May and November, in both digital and print formats. Its first Issue was published in November 2013.

It is an international peer-reviewed journal publishing in English original research studies and reviews in all aspects of competence-based, student-centred, and outcome-oriented education reforms at university level across the globe. The Journal publishes both thematic and unsolicited contributions on pressing educational needs of contemporary societies. At any time of the year, the Journal welcomes submissions related to its scope and focus. The submitted manuscript should not have been previously copyrighted or published in any form, including electronic media and databases, and must not be currently under consideration for publication elsewhere. The editorial staff uses the TURNITIN software to verify the originality of manuscripts submitted to the Journal. Manuscripts under consideration for publication in Tuning Journal cannot be submitted elsewhere without formal withdrawal approved by the Editor. A copyright transfer agreement must be signed after acceptance but before publication.

These Guidelines should be used with reference to the *TJHE Ethical Guidelines for Publication*, *Peer Review* instructions, and *Copyright Notice*; all of which are available at the web page of the Journal (http://www.tuningjournal.org/).

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To expedite the review process, please format your manuscript as follows:

1. Prepare your manuscript as a single editable Microsoft Word or Open Office document with line numbering, using the template downloadable from the web page of the Journal (http://www.tuningjournal.org/about/submissions#authorGuidelines). The file should include the complete text, references, tables and figures. All revised manuscripts should again be sent as a single editable document.
2. Manuscripts must be written in either UK English or U.S. English consistently and include a 100-300 word abstract. The title page should include authors' affiliations plus the email address of a single corresponding author. The Chicago Manual of Style (CMOS), 16th or later edition, should be used as a reference for manuscript preparation (www.chicagomanualofstyle.org/).
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The Editor will prepare a decision letter based on the comments of the reviewers and the recommendation of the Advisory Editor, which will be sent to the corresponding author by email.

It is our intention that all non-reviewed manuscripts will be sent back within 21 days of submission acknowledgement and that a first decision letters for manuscripts will be sent within 8 weeks of receipt.

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Currently, no charges for manuscript submission, processing, and publication are applicable.

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TJHE
Ethical Guidelines for Publication

TJHE Ethical Guidelines for Publication

FINAL VERSION (MARCH 2015)

Tuning Journal for Higher Education (TJHE), Tuning Journal in short, is an international journal publishing in English original research studies and reviews in all aspects of competence-based, student-centred, and outcome-oriented education reforms at university level across the globe. It is published by the University of Deusto's Publications department on behalf of the International Tuning Academy (Tuning Academy in short), a jointly managed project of the Universities of Deusto (Spain) and Groningen (The Netherlands). The Journal, essentially an open access, online and peer-reviewed publication, is committed to maintain the highest ethical standards. Hence, the involvement of any stakeholder in any function connected with TJHE, including acting as an editor, the reviewing of manuscripts, the management and production of the Journal and the authorship and submission of manuscripts implies acceptance of and adherence to **TJHE Ethical Guidelines for Publication**.

* The term *Editor(s)* as used below refers to Editors, Advisory Editors, Guest Editors, and Editorial Board members when delegated to serve in an editorial capacity.

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1.1. The Editorial Board is appointed by the Tuning Academy in consultation with the Universities of Deusto and Groningen.

1.2. The Editorial Board is responsible for setting policy, appointing the Editor and Advisory Editors of the Journal.

1.3. The Editor is responsible for ensuring that publication policies set by the Editorial Board are carried out.

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1.5. The Managing Board is responsible for the commercial management of the Journal and appointing a Managing Editor.

1.6. The Managing Editor is responsible for ensuring that the commercial policies set by the Management Board are carried out.

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3.6. Manuscripts will contain proper citation of works by others, especially publications of the original hypotheses, ideas, and/or data upon which manuscript is based or addresses.

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a) Authorship should be limited to those who have made significant contributions to the concept, design, execution or interpretation of the work reported in a manuscript; others who have contributed should be acknowledged;

b) Author order should be agreed on by all authors as should any changes in authors and order that occur while the manuscript is under review or revision. Changes in authorship must be submitted to the Editor in writing and must be signed by all authors involved.

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3.9. Authors are encouraged to disclose major funding sources (e.g., government agencies, private foundations, private industry, and universities) for reported research.

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4.5. Reviewers must ask the Editor for permission to discuss the paper with others for specific advice, giving names and reasons for such consultation.

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Date: 16 March 2015

Approved by the TJHE Editorial Board and signed on behalf of the Tuning Academy by:

Pablo Beneitone
Director, Tuning Academy (Deusto)

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Director, Tuning Academy (Groningen)

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Academics, programmes, and methodologies for fostering students' competences

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