

The individual watching of one's own video and its influence on future biology teachers' professional vision

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Abstract: The student teacher usually learns their trade under the guidance of a mentor during teaching practice. Reflections usually take place after the mentor's observation of the student's lesson, and take the form of an interview between the two participants. Recently, video recordings have been used advantageously to add an extra dimension to such professional development. In the classroom, at the time of the lesson, future teachers may not notice certain events, but using video helps them review, and analyse their attributes, thereby making the reflective process more effective. The development of 'professional vision' consists of two processes: (1) noticing different events and (2) assessing and appraising themselves.¹ This study analysed four written reflections (two pairs from each) from future biology teachers (n = 65) during their practice at ISCED 2 (International Standard Classification of Education 2 – lower secondary education, pupils from 11 to 15 years old) and at ISCED 3 (International Standard Classification of Education 3 - upper secondary education, pupils from 15 to

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¹ Miriam Gamora Sherin, "The Development of Teachers' Professional Vision in Video Clubs," in *Video Research in the Learning Sciences*, ed. Ricky Goldman et al. (New York: Routledge, 2007): 383-395.

19 years old) schools.² The first reflection in the pair ('pre-reflection') was written without video recordings, and the second ('post-reflection') with the support of video recordings. The reflections were divided into statements, and coded according to Sherin and van Es'³ categorisation system. Statistically significant changes were found in several categories of professional vision in the students' statements. During practice at ISCED 2 school (the first practice in the curriculum) students commented more often in the Self, Pedagogy, Management, Evaluate and Alteration categories in post-reflection, and less in the Student, Curriculum, Subject, Climate and Describe categories. During (the second) practice at ISCED 3 school, students dealt more with Self and Alteration categories in post-reflection. These findings persuaded us that the use of two practices based on video-supported reflection of one's own lessons is effective in prospective biology teachers' development of their professional vision.

Keywords: Prospective teacher; biology teacher; reflection; teaching practice; professional vision.

I. Introduction

Teaching practice is an integral part of the student teacher's education, where they learn the role of how to be a teacher.⁴ Recently, video recordings have been used advantageously for reflective purposes, initially by the student teacher themselves, and then on occasion with the mentor.^{5,6} The advantage of using video is that, in the classroom, student teachers may not notice certain events. They may, however, analyse the lessons later, thereby making the reflective process more effective.⁷ In our study, we focused on the question of whether individual tracking of a student teacher's own video-related reflection contributes to their professional development. If so, then such individual reflection could be a good starting point for a reflective interview with a mentor. In addition, we focused upon whether the student teacher continues to develop their professional vision during their second

² ISCED, UNESCO, "International Standard Classification of Education," (2011).

³ Miriam Gamoran Sherin, and Elizabeth Van Es, "Effects of Video Club Participation on Teachers' Professional Vision," *Journal of Teacher Education* 60, no. 1 (2007): 20-37.

⁴ John Loughran, *Developing a Pedagogy of Teacher Education: Understanding Teaching & Learning about Teaching* (London: Routledge, 2006).

⁵ Tomáš Janík and Tina Seidel, *The Power of Video Studies in Investigating Teaching and Learning in the Classroom* (Münster: Waxmann Verlag, 2009).

⁶ Tonya Tripp and Peter Rich, "Using Video to Analyze One's Own Teaching," *British Journal of Educational Technology* 43, no. 4 (2012): 678-704.

⁷ Brendan Calandra, *Digital Video for Teacher Education: Research and Practice* (New York: Routledge, 2014).

practice when supported by video. Because the development of professional competences cannot be explored, we have chosen only the professional vision segment to ascertain any shift in the components of 'noticing' and 'knowledge-based reasoning'.⁸

II. Literature review

Becoming a teacher does not happen in just one day. Rather, it is a process which a student teacher needs to go through. "To go through" does not mean simply waiting to become a good or even great teacher. It means to overcome difficulties (which are likely to arise) and to try to reflect on every feature in the lesson and this should be considered an opportunity to modify one's practice in the pursuit of more successful outcomes.

Pedagogical practice is the first part of a teacher's journey. For the majority, it is the first opportunity to experience how it is to be a teacher. There is a great deal of new information to encounter and process to assimilate.

Căpitanu and Drăgan⁹ indicate that student teachers perceive pedagogical practice to be very demanding, especially at the beginning. Such learners mentioned the difficulty of establishing the same atmosphere of acceptance from pupils, as well as the difficulty of reacting as more experienced teachers would. Some of these student teachers even noted that the experience of conducting their first lesson raised self-doubts about their desire or ability to become a teacher.

Student teachers, especially at the start of their career (e.g. on the practice at ISCED 2 schools, which is their first experience of teaching in our case) do not have much experience. This means that their expectations of what constitutes good teaching performance could be different and even unrealistic relative to more experienced colleagues.¹⁰ According to the same study by Chan et al., watching videos from one's own lesson could elicit emotions that need to be addressed. Putting a positive light on this, student teachers (or even more experienced practitioners, for that matter) observing themselves

⁸ Miriam Gamoran Sherin and Elizabeth Van Es, "Effects of Video Club Participation on Teachers' Professional Vision," *Journal of Teacher Education* 60, no. 1 (2007): 20-37.

⁹ Carmen-Daniela Căpitanu and Simona-Nicoleta Drăgan, "Considerations on the Complexity of Teaching Practice of Student Teachers," *Procedia-Social and Behavioral Sciences* 180 (2015): 736-743.

¹⁰ Kennedy Kam Ho Chan, Cuiling He, Richard Chi Keung Ng, and Jessica Shuk Ching Leung, "Student teachers' Emotions When Watching Their Own Videos and Those of Their Peers," *Journal of Professional Capital and Community* 3, no. 3 (2018): 192-211.

on video are very often motivated to try to improve their teaching strategies almost immediately.¹¹

Reflections written with the benefit of video review are unlike those written only on the basis of memory alone, and have significant advantages.¹² There is evidence of their positive influence which points to greater objectivity and criticality. Mistakes are detected more easily, and common characteristics appear. Student teachers watching their own video from a lesson very often mention specifically the proportion of teacher talk, student attention span, students' increasing interest and their style of communication. Further typical statements relate to how they appear in front of the class, their use of gesture, and one of voice.¹³

Reflection merely from memory may be inadequate, and even counter-productive, in that a student teacher may be overwhelmed by impressions of the amount of interaction to be analysed. Without video, they have difficulty noticing all the interactions, and in prioritising them. The benefit in watching their own video-recorded lesson is also in focusing on the effect of, for example, their instruction on the pupils' activities, pupil behavior and accomplishment of intended learning outcomes can also be better judged.¹⁴

Nevertheless, it can be selective or even deceptive for the novice. In that case, review of video evidence can be a useful tool for the mentor to encourage deeper engagement with certain issues, which is not the case of this study and could be examined in further research.¹⁵

This research attempts to address a gap identified in a study by Coddington.¹⁶ Accordingly, we examined written reflections relating to personal video from the lesson, and determined their most important features.

¹¹ Jim Knight, Barbara A. Bradley, Michael Hock, Thomas M. Skrtic, David Knight, Irma Brasseur-Hock, Jean Clark, Marilyn Ruggles, and Carol Hatton, "Record, Replay, Reflect: Videotaped Lessons Accelerate Learning for Teachers and Coaches," *Journal of Staff Development* 33, no. 2 (2012): 18-23.

¹² Bing Xiao and Joseph Tobin, "The Use of Video as a Tool for Reflection with Preservice Teachers," *Journal of Early Childhood Teacher Education* 39, no. 4 (2018): 328-345.

¹³ Sumru Akcan, "Watching Teacher Candidates Watch Themselves: Reflections on a Practicum Program in Turkey," *Profile Issues in Teachers' Professional Development* 12, no. 1 (2010): 33-45.

¹⁴ Estella Williams Chizhik and Alexander Chizhik, "Value of Annotated Video-Recorded Lessons as Feedback to Teacher-Candidates," *Journal of Technology and Teacher Education* 26, no. 4 (2018): 527-552.

¹⁵ Bing Xiao and Joseph Tobin, "The Use of Video as a Tool for Reflection with Preservice Teachers," *Journal of Early Childhood Teacher Education* 39, no. 4 (2018): 328-345.

¹⁶ Lorelei Coddington, "Teachers' Perspectives on Using Video-Recorded Lessons During Professional Development," Annual Meeting of the American Educational Research Association (Sant Antonio: 2017).

The ability to formulate a professional judgement (sometimes called “professional vision”) is one of the key capabilities of the teacher.¹⁷ Sherin discusses two components of professional vision: “noticing” and “knowledge-based reasoning”. In analysis of professional vision, qualitative approaches are usually used, and respondents’ statements coded according to different categorisation systems.¹⁸ Sherin and van Es’ system shows what students notice during activities in their teacher’s preparation (teaching a lesson, watching video, writing reflections, discussing with others etc.) and how they react. Noticing can be understood as the skill of a teacher’s paying attention to areas that are important for teaching and learning in the classroom. The process of knowledge-based reasoning is a way in which a teacher reasons about what is noticed based on his/her knowledge and understanding. Specifically, the “noticing” component is complemented by Actor and Topic areas, and the “knowledge-based reasoning” component by the areas of Stance and Specificity.¹⁹

III. Methodology

Two research questions are addressed.

Research question 1: Is there a change in the professional vision of student teachers when they watch their own video individually during their first practice? If so, in what ways?

Research question 2: Are there any changes in the professional vision of student teachers, during their second practice?

III.1. *Participants of the research and gathering of data*

Participants were student teachers (n=65) in the Faculty of Education at Charles University studying for their Master’s degree in the discipline of Teacher Training for Secondary School Biology. These participants studied during the 2016/2017 and 2017/2018 academic years. There were two

¹⁷ Jan Slavík, Jindřich Lukavský, Petr Najvar, and Tomáš Janík, “Profesní Soud o Kvalitě Výuky: Předem a Následně Strukturovaná Reflexe,” *Pedagogika* 65, no. 1 (2015): 5-33.

¹⁸ Miriam Gamoran Sherin, “The Development of Teachers’ Professional Vision in Video Clubs,” in *Video Research in the Learning Sciences*, ed. Ricky Goldman et al. (New York: Routledge, 2007): 383-395.

¹⁹ Miriam Gamoran Sherin and Elizabeth Van Es, “Effects of Video Club Participation on Teachers’ Professional Vision,” *Journal of Teacher Education* 60, no. 1 (2007): 20-37.

groups: the first (Group 1, n=28) comprised those on their first year of their Master's degree (so they completed their practice at lower secondary schools ISCED 2). The second (Group 2, n=37) comprised those studying on their second year at Master's level (completing their practice at upper secondary school ISCED 3).

Research was conducted during the participants' pedagogical practice, which was an integral part of the curriculum. They were required to prepare and individually teach a lesson, on a biological topic of their choice, and using any methods and organisational forms. The only requirement was to video all 45 minutes of the lesson. They were then asked to write two reflections on that lesson. The length of reflections was not specified, so the student teachers could reflect on their lessons as fully as they felt necessary. In this paper, the first reflection (without video) is called pre-reflection, and the second (with support of video) is called post-reflection. As the only data source for the first reflection was memory, participants were asked to write it within 24 hours of teaching. The second reflection was written after watching their lesson on video, and so could be submitted within 14 days and any number of views. In total, 130 reflections were analysed.

III.2. Analysis of data

According to our stated research questions, we wanted to compare change in the professional vision between the first and second practice. We used a combination of methods for data analysis to explore not only the quality, but also frequency of surveyed categories. There are some similar pieces of research using the categorisation system mentioned here, but most focus on disciplines other than biology.^{20, 21}

A verbal method for analysis of written reflections was used. This method can be used to quantify qualitative coding of the contents of verbal utterances, and consists of steps: reducing and segmenting the text, choosing a coding scheme, operationalizing evidence for coding, depicting coded data, seeking pattern in the depicted data, interpreting the pattern, and repeating the whole process.

²⁰ Klára Uličná, "To See or Not to See: Profesní Vidění Budoucích Učitelů Anglického Jazyka a Budoucích Učitelů pro 1. Stupeň se Specializací na Anglický Jazyk," *Pedagogická Orientace* 27, no. 1 (2017): 81-103.

²¹ Naďa Vondrová, Jana Cachová, Jana Coufalová, and Magdalena Krátká, "„Lesson Study” v Českých Podmínkách: Jak Učitelé Vnímali Svou Účast a Jaký Vliv Měla na Jejich Všímnání si Didakticko-Matematických Jevů," *Pedagogika* 66, no. 4 (2016): 427-442.

Written reflections were separated into partial segments assigned to the same category system as in Sherin's and van Es's research.²² In this system, there are four dimensions of student statements, with each one divided into categories. We modified it in order to be suitable for analysis of written reflections of biology student teachers. Originally it was used for analysis of transcripts of discussion of mathematics teachers. The dimension Actor has the following categories: Teacher (supervising teacher or teacher as representative of a larger group of teachers, not student teacher), Student (pupil or pupils seen in video or pupils as representative of a larger group of pupils), Self (student teacher teaching a lesson and reflecting own teaching), Curriculum (person who developed materials within lesson, tasks, texts, curriculum), and Other (anything else). The dimension Topic consists of Subject (biology or didactics of biology), Pedagogy (pedagogy and general didactics), Climate (social environment of the lesson, motivation and engagement of pupils etc.), Management (organization of classroom, behaviour, discipline), and Other (anything else) categories. The Stance dimension is divided into Describe (simple description of events in lesson), Evaluate (expression what event in lesson is bad or good) and Interpret (making inference, explanation) categories, and the last dimension, Specificity, includes the categories Specific (specific event in lesson, specific pupil) and General (general phenomena in the whole lesson). In this research, the fifth dimension of statements presented suggested Alterations ("What to do differently in teaching") is introduced as well (see tab. 1). Each statement was assigned to one category from each dimension. Therefore, the gathered data could be represented numerically, and we could have used statistical methods.^{23, 24} This approach is quite usual in research focused on professional vision. The process of coding was a collaborative procedure in which two researchers worked together to achieve a consensus in cases of disputable statements. The whole process met three controls of correctness. The MS Excel descriptive statistic was used to evaluate the data.

Here are some examples of categories used. The statement "It would be probably better and less difficult to students' orientation in a workbook if

²² Miriam Gamoran Sherin and Elizabeth Van Es, "Effects of Video Club Participation on Teachers' Professional Vision," *Journal of Teacher Education* 60, no. 1 (2007): 20-37.

²³ Kevin Miller and Xiaobin Zhou, "Learning from Classroom Video: What Makes it Compelling and What Makes it Hard." In *Video Research in the Learning Sciences*, ed. Ricky Goldman et al. (New York: Routledge, 2007): 321-334.

²⁴ Adrian Simpson and Naďa Vondrová, "Developing Pre-Service Teachers' Professional Vision with Video Interventions: a Divergent Replication," *Journal of Education for Teaching* (2019): 1-18.

they take notes continuously and not just after explanation of some part of the curriculum” we coded as: Student, Pedagogy, Interpret, General, Alteration. The statement “At the introductory slide I had five pictures and I asked what animal it was” meanwhile, we coded as: Self, Subject, Describe, General, Without alteration.

Table 1
Possible dimensions and categories of statements

Dimension	Categories
Actor	Teacher – Student – Self – Curriculum – Other
Topic	Subject – Pedagogy – Climate – Management - Other
Stance	Describe – Evaluate – Interpret
Specificity	Specific – General
Alterations	Alteration – Without alteration

To introduce the number of units in pre- and post-reflections of both groups, the minimum, maximum and total were identified. Mean, median and standard deviation were identified by statistical enumeration as well. The Wilcoxon signed-rank test was used because of the number of respondents, and the fact that two reflections from every respondent were examined. For results of concrete dimensions (Actor, Topic, Stance, Specificity and Alteration) the mean, standard deviation and p-value were identified. In each table, the relative number/percentage of statements (from the overall number of statements for given dimension) is given.

The relative proportion of statements in pre- and post-reflections were compared. Any p-value smaller than 0.05 is statistically significant. These values are marked with an asterisk. Among the proportion of statements in pre- and post-reflections, there is statistical significance of a difference of 5%.

IV. Results

The number of units in pre- and post-reflections of both groups of respondents (tab. 2) shows the diversity in length of written reflections. The median number of units is quite close in intervals, between 18 and 22 units per reflection, and this does not change with either the group of students or the type of reflection.

Table 2

Number of units in pre and post reflection of group 1 and 2, 2016/2017 and 2017/2018 (mean and std. deviation are rounded to whole numbers)

Type of reflection	Number of units					
	Min.	Max.	Total	Mean	Median	Std. deviation
Group 1 (n=28)						
Pre reflection	7	52	670	24	20	13
Post reflection	5	44	614	22	18	11
Group 2 (n=37)						
Pre reflection	7	54	856	23	22	11
Post reflection	5	72	792	21	18	13

Dimension Actor and its categories

From tab. 3, it is seen that the focus of Student and Curriculum categories in the group 1, there is a significant decrease in post-reflections. Student teachers pay more attention to the category Self in post-reflections, which means they concentrate the most on themselves in the role of teacher from all events seen on video. It is clear that the increasing focus on category Self has an associated decreasing influence on categories Student and Curriculum. It is important in group 2 to note that there is also a significant increase in Self category in post-reflections, which is a necessary starting point for reflection of practice and for mentor involvement. Category Teacher is mentioned the least often, because it relates to a class teacher who does not appear at all in the video.

Table 3

Frequency of occurrence Actor dimension and its categories

Categories	Group 1			Categories	Group 2		
	Mean	Std. deviation	p-value		Mean	Std. deviation	p-value
Teacher_Pre	1.60%	2.86%	0.227	Teacher_Pre	2.45%	3.02%	0.189
Teacher_Post	0.94%	2.58%		Teacher_Post	2.20%	4.51%	

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Categories	Group 1			Categories	Group 2		
	Mean	Std. deviation	p-value		Mean	Std. deviation	p-value
Student_Pre	31.05%	12.41%	0.038*	Student_Pre	26.62%	12.47%	0.511
Student_Post	23.31%	13.25%		Student_Post	25.24%	12.45%	
Self_Pre	40.96%	17.26%	0.005*	Self_Pre	40.58%	11.97%	0.012*
Self_Post	52.81%	11.77%		Self_Post	48.19%	14.15%	
Curriculum_Pre	10.21%	7.90%	0.000*	Curriculum_Pre	11.95%	9.45%	0.123
Curriculum_Post	5.55%	8.97%		Curriculum_Post	7.81%	8.53%	
Other_Pre	16.18%	10.21%	0.999	Other_Pre	18.39%	10.00%	0.999
Other_Post	17.40%	12.78%		Other_Post	16.57%	11.30%	

Dimension Topic and its categories

Tab. 4 shows a statistically significant decrease in the Subject and Climate categories in post-reflection as compared with pre-reflections of group 1. This group otherwise paid significantly more attention to the Pedagogy and Management categories in post-reflections. These results mean that student teachers decreased their attention to subject didactics phenomena as well as those phenomena related to classroom climate context (social environment of the classroom, motivation, engagement etc.). In contrast, they started to pay attention to general pedagogy events and management events (e.g. organisation of classroom, discipline of pupils) after watching the video of their lesson. With group 2, there is no significant difference seen in these categories.

Table 4

Frequency of occurrence Topic dimension and its categories

Categories	Group 1			Categories	Group 2		
	Mean	Std. deviation	p-value		Mean	Std. deviation	p-value
Subject_Pre	24.79%	16.18%	0.000*	Subject_Pre	15.91%	11.11%	0.391
Subject_Post	12.84%	9.72%		Subject_Post	11.11%	9.64%	

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Categories	Group 1			Categories	Group 2		
	Mean	Std. deviation	p-value		Mean	Std. deviation	p-value
Pedagogy_Pre	31.62%	10.97%	0.038*	Pedagogy_Pre	38.09%	12.15%	0.405
Pedagogy_Post	39.86%	14.76%		Pedagogy_Post	40.47%	12.39%	
Climate_Pre	17.60%	11.14%	0.031*	Climate_Pre	14.90%	11.23%	0.868
Climate_Post	11.97%	8.08%		Climate_Post	14.51%	12.05%	
Management_Pre	15.25%	7.86%	0.021*	Management_Pre	15.84%	11.33%	0.735
Management_Post	22.99%	14.06%		Management_Post	19.23%	14.49%	
Other_Pre	10.74%	7.18%	0.441	Other_Pre	15.25%	10.98%	0.617
Other_Post	12.33%	8.65%		Other_Post	14.69%	11.31%	

Dimension Stance and its categories

The results quoted in tab. 5 show significant changes in categories Describe and Evaluate in pre-reflections in student teachers who participated at ISCED 2 schools (group 1). Sharing of describing statements decreased after watching one's own video, while sharing of evaluating statements increased. The number of units coded as Interpret (considered the most advanced in development of professional vision) was higher in post-reflections of group 1, but not statistically significant. We see almost no shift in group 2, when students fulfilled their second practice during university studies, and watching their own video for the second time.

Table 5

Frequency of occurrence Stance dimension and its categories

Categories	Group 1			Categories	Group 2		
	Mean	Std. deviation	p-value		Mean	Std. deviation	p-value
Describe_Pre	43.45%	16.94%	0.005*	Describe_Pre	39.03%	20.24%	0.742
Describe_Post	27.86%	14.69%		Describe_Post	35.00%	17.24%	

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Categories	Group 1			Categories	Group 2		
	Mean	Std. deviation	p-value		Mean	Std. deviation	p-value
Evaluate_Pre	28.75%	16.92%	0.038*	Evaluate_Pre	31.58%	17.67%	0.324
Evaluate_Post	39.26%	14.18%		Evaluate_Post	34.10%	14.97%	
Interpret_Pre	27.80%	13.31%	0.089	Interpret_Pre	29.39%	15.27%	0.742
Interpret_Post	32.88%	14.62%		Interpret_Post	30.91%	15.52%	

Dimension Specificity and its categories

In tab. 6, there are data presented from using statements related to the specificity or generality of statements. We can see a very mild (and not statistically significant) decrease of specific statements in post-reflections in both groups of students. Students started to pay more attention to general phenomena in their teaching at the expense of specific events in the lesson (specific student, specific task, direct quote of students’ answers etc.).

Table 6

Frequency of occurrence Specificity dimension and its categories

Categories	Group 1			Categories	Group 2		
	Mean	Std. deviation	p-value		Mean	Std. deviation	p-value
Specific_Pre	22.88%	15.28%	0.089	Specific_Pre	17.52%	13.23%	0.296
Specific_Post	17.58%	9.43%		Specific_Post	16.15%	13.75%	
General_Pre	77.12%	15.28%	0.089	General_Pre	82.48%	13.23%	0.296
General_Post	82.42%	9.43%		General_Post	83.85%	13.75%	

Dimension Alterations

In tab. 7, there is a comparison mean, standard deviation and p-value of Alterations in groups 1 and 2. The statements containing some suggested Alteration in both groups of respondents point out the use of significantly more such oriented statements in post-reflections.

Table 7
Frequency of occurrence Suggested alterations dimension and its categories

Categories	Group 1			Categories	Group 2		
	Mean	Std. deviation	p-value		Mean	Std. deviation	p-value
Alteration_Pre	3.90%	5.96%	0.027*	Alteration_Pre	2.73%	4.81%	0.000*
Alteration_Post	9.19%	9.00%		Alteration_Post	10.59%	14.09%	

V. Discussion

We decided to take combination of methods for data analysis as we consider the opportunity to examine frequency of used categories as important. The main benefit is in the way to point out at quality of statements as well as differences in categories of professional vision which can change in student teachers with different background.

Written reflections were undertaken in naturalistic settings. This lent itself to the adoption qualitative research methods, as numerous variabilities that could have influenced the way of writing reflections were not controlled.²⁵

Each participant expressed their individual understanding of their lesson. Although the reflections did not consist of a standard list of questions, and particular information about the lesson was obtained, the responses were coded in qualitative way and then analyzed quantitatively.²⁶ According Bazeley, the size of the sample we investigated was sufficient for quantification in percentages.²⁷ Although we used qualitative research, we also used quantitative data because it has important (meaningful) value.

V.1. Dimension Actor and its categories

The Teacher category is mentioned rarely because participants reflected on their own lessons, and not on another teacher's (e.g. class teacher). Of

²⁵ Michelene T. H. Chi, "Quantifying Qualitative Analyses of Verbal Data: A Practical Guide," *The Journal of the Learning Sciences* 6, no. 3 (1997): 271-315.

²⁶ Janice M. Morse, "Evolving trends in qualitative research: advances in mixed-method design," *Qualitative health research* 15, no. 5 (2005): 583-585.

²⁷ Pat Bazeley, "Issues in Mixing Qualitative and Quantitative Approaches to Research," *Applying Qualitative Methods to Marketing Management Research*, ed. Buber, Gardner, Richards et al. (UK: Palgrave Macmillan, 2004): 141-156.

course, some comments in this category did appear because the teacher could attend every lesson (including the videotaped one). In such cases, teachers intervened in the lesson, and so student teachers referred to them. In research by Minaříková et al.²⁸ student teachers concentrated in their reflections on themselves instead of on the pupils. Orientation was shifted, though, from “actor” (i.e. teacher) to “stage director’s attitude”, meaning that they focused more on pupils after a few experiences with video reflecting.²⁹

According to Kagan,³⁰ new teachers are busy trying to understand the complexity of management, behavior and such, so it may be natural that they reflect more on their own performance than on the activities of their students. Comments in the category Self have significantly increased the tendency to appear in both groups of respondents in post-reflection (written after watching their video from the lesson). This fact is evidence of the benefits of videos for student teachers in developing their skills in the process of pedagogical practice as well as when watching their own video repeatedly. According to McConnell et al.³¹ and Chan et al.³² the results of observations can be influenced by the number of viewings. In our research, the number of watching videos was not investigated. The numbers of statements dedicated to the category Curriculum describing the situations, curriculum developers, the task itself, and the topic of the lesson are similar in the pre-reflections to that in Pavlasová’s research.³³

V.2. Dimension Topic and its categories

There is a significant decrease in representation of comments related to the Subject category in post-reflections by both groups, but especially in group 1.

²⁸ Eva Minaříková, Michaela Pířšová, Tomáš Janík, and Klára Uličná, “Video Clubs: EFL Teachers’ Selective Attention before and after,” *Orbis Scholae* 9, no. 2 (2015): 55-75.

²⁹ Natalia Orlova, “Video Recording as a Stimulus for Reflection in Pre-Service EFL Teacher Training,” *English Teaching Forum* 47, no. 2 (2009): 30-35.

³⁰ Dona M. Kagan, “Professional Growth among Preservice and Beginning Teachers,” *Review of Educational Research* 62, no. 2 (1992): 129-169.

³¹ Tom J. McConnell, Mary A. Lundeberg, Matthew J. Koehler, Mark Urban-Lurain, Tianyi Zhang, Jamie Mikeska, Joyce Parker, Meilan Zhang, and Jan Eberhardt, “Video-Based Teacher Reflection - What is the Real Effect on Reflections of Inservice Teachers,” Annual Meeting of the Association of Science Teacher Education (Oxford: Routledge, 2008).

³² Kennedy Kam Ho Chan, Cuiling He, Richard Chi Keung Ng, and Jessica Shuk Ching Leung, “Student Teachers’ Emotions when Watching Their Own Videos and Those of Their Peers,” *Journal of Professional Capital and Community* 3, no. 3 (2018): 192-211.

³³ Lenka Pavlasová, “Profesní Vidění Studentů Učitelství Biologie Zaměřené na Obor a Oborově Didaktické Jevy,” *Scientia in Educatione* 8, no. 2 (2017): 84-99.

This considered undesirable, as in Sherin's³⁴ survey, where the student teachers of mathematics placed little emphasis on subject thinking. In post-reflections from both groups of our respondents, less attention was paid to Subject than to Pedagogy events. Our results from the Subject category in post-reflections are similar to Pavlasová's,³⁵ with only difference being that her participants reflected on another teacher's video. In our study, Pedagogy comments were significantly more commonly represented by group 1 in post-reflections.

Even though the noticing of Management events could be quite difficult for student teachers (especially at the start of their career), we detected an increase in the number of those comments, mostly in post reflections. We propose that this is because student teachers are not able to perceive every pupil activity during the lesson, but in the video are better able to see that pupils may not be working, desks may be inappropriately situated, and some pupils may be disruptive.

The same findings are mentioned by Sonmez and Hakverdi-Can,³⁶ where participants were able to identify strengths and weakness of their lesson when using videos. There are no significant changes for group 2 in Pedagogy and Management categories.

V.3. Dimension Stance and its categories

A very important finding is the change in the proportion of Describe and Evaluate statements among group 1 respondents. In the majority of pre-reflections, statements were merely descriptive in character, and provided an enumeration of events from the lesson. A similar phenomenon was mentioned by Cocca and Cocca,³⁷ as well as by Minaříková.³⁸ After the

³⁴ Miriam Gamoran Sherin and Elizabeth Van Es, "Effects of Video Club Participation on Teachers' Professional Vision," *Journal of Teacher Education* 60, no. 1 (2007): 20-37.

³⁵ Lenka Pavlasová, "Profesní Vidění Studentů Učitelství Biologie Zaměřené na Obor a Oborově Didaktické Jevy," *Scientia in Educatione* 8, no. 2 (2017): 84-99.

³⁶ Duygu Sonmez and Meral Hakverdi-Can, "Videos as an Instructional Tool in Pre-Service Science Teacher Education," *Eurasian Journal of Educational Research* 46 (2012): 141-158.

³⁷ Michaela Cocca and Armando Cocca, "Using Video Analysis Tool and Self-Reflection as a Response to Education Changes in Teachers' Evaluation in Mexico," in *Proceedings of 13th International Conference on Efficiency and Responsibility in Education*, ed. Martin Flégl, Milan Houška and Igor Krejčí (Prague: Czech University of Life Science, 2016): 66-72.

³⁸ Eva Minaříková, "Profesní Vidění Studentů Učitelství Anglického Jazyka: Jak Vidí Studenti Výukové Situace Zachycené na Videu?," *Pedagogická Orientace* 24, no. 5 (2014): 753-777.

opportunity to see themselves on video, though, some teachers changed their method of reflection to include more evaluative statements. According to Sherin and van Es,³⁹ for example, teachers began to take more care of the explanation and justification of events in the education process after one year's attendance at the video club. There is a considerable shift from merely describing events in pre-reflections towards their evaluation in post-reflection which indicates a desirable shift in professional vision. Such a shift does not occur in group 2, these teachers have more experience from their second practice, and they have more realistic notions of the processes involved in their teaching. For these experienced student teachers, the mentor would be needed to insight into the student's development towards a higher level of their professional vision. Our results support the idea of the usefulness of videos for students on their first practice, even when they watch their video alone. Cocca and Cocca's⁴⁰ results help teachers offer more complex analysis that includes both evaluate positive and negative events, as well as proposed alternatives. However, the number of Interpretations was virtually unchanged, and a discussion with a mentor or a group of students would probably be needed.

V.4. Dimension Specificity and Alteration

The specific phenomena of the teaching process is more likely put forward in our studies than in those of another's video reflection.^{41,42}

A very important feature is that the frequency of comments offering alternative techniques or processes statistically significantly increased in both groups for those reflections written with the aid of video review. This means that even watching one's own video alone is beneficial for a student teacher's professional vision to develop. We have to say that we have not examined further the quality of alterations nor the possibility of introducing

³⁹ Miriam Gamoran Sherin and Elizabeth Van Es, "Effects of Video Club Participation on Teachers' Professional Vision," *Journal of Teacher Education* 60, no. 1 (2007): 20-37.

⁴⁰ Michaela Cocca and Armando Cocca, "Using Video Analysis Tool and Self-Reflection as a Response to Education Changes in Teachers' Evaluation in Mexico," in *Proceedings of 13th International Conference on Efficiency and Responsibility in Education*, ed. Martin Flégl, Milan Houška and Igor Krejčí (Prague: Czech University of Life Science, 2016): 66-72.

⁴¹ Lenka Pavlasová, "Profesní Vidění Studentů Učitelství Biologie Zaměřené na Obor a Oborově Didaktické Jevy," *Scientia in Educatione* 8, no. 2 (2017): 84-99.

⁴² Lenka Pavlasová, Jana Stará, Naďa Vondrová, Magdalena Novotná, Jarmila Robová, and Klára Uličná, "Výběrové Zaměření Pozornosti u Studentů Učitelství a Povaha Jejich Interpretací," *Pedagogika* 67, no. 1 (2017): 5-24.

them into teaching. We consider their mere occurrence, though, to be a positive influence in realizing the possibility of change.

V.5. Limitations of the study and recommendation for teacher educators

The first limitation of this study lies in the low total number of respondents. We analyzed written reflections from the available samples of prospective teachers, but only around a third of those eligible from ISCED 2 and 3 schools chose to videotape their lesson and work with their own video.

Another limitation of this study is that we investigated just those statements which were explicitly freely noticed by student teachers in written reflections, and not those arising, for example, during mentor interviews. We did not have the opportunity to ask more questions to find out exactly what was meant by a given statement. Preliminary analysis of videos suggests that student teachers did not notice (and so did not comment on) other important phenomena. It would be interesting to look into this aspect in future research.

Our recommendations for practice to teacher educators (guarantors of pedagogical practices, mentors) is to include the watching of prospective students' videos from their lesson in their preparation for becoming a teacher. Watching one's own video at least twice leads to changes in professional vision.

VI. Conclusions

There is a need for future teachers to reflect on their own teaching as realistically as possible. To prompt this, space was established in which student teachers could work with video from their own lesson.

During the first practice, we found a statistically significant shift across a wide range of professional vision categories. In the second practice, when student teachers were more experienced, we found a statistically significant shift, but in only two categories (Self and Alteration). This implies that student teachers during their first practice gain from the videotaped lesson, learn to what to find out and what to focus on which was not obvious before watching their own videotaped lesson. Then, in the second teaching practice, she/he is already basing on experiences and is able to observe sufficiently nearly all the phenomena that occur in the teaching. For this reason, video-less and video-based reflections differ much less than during the first practice.

Nevertheless, we consider the inclusion of a second experience with video of one's own lesson as important, since the student teachers noticed more on herself/himself as a teacher and suggested more alterations. Both the categories of Self and Alteration increase in post-reflection.

Thus, the student teachers noticed more about themselves professionally, and suggested more alterations. Pausing or replaying specific sections allows the student teacher enough time to think through alternative procedures - an important part of the reflective cycle.⁴³

Our results show that the inclusion in the curriculum of working with one's own video during the pedagogical practice even during the practice at ISCED 2 and as well at ISCED 3 school is effective. It is beneficial to professional vision even if watched independently (without the mentor's participation), when associated with a written reflective task. Subsequently, the mentor can supplement the benefit by focussing on events to which student teachers did not pay any attention.

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⁴³ Eva Minaříková and Tomáš Janík, "Profesní Vidění Učitelů: Od Hledání Pojmu k Možnostem Jeho Uchopení," *Pedagogická Orientace* 22, no. 2 (2012): 181-204.

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The individual watching of one's own video and its influence on future biology teachers' professional vision

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