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To cite this article: Edgar Krull , Kaja Oras & Endrik Pikksaar (2010) Promoting student teachers' lesson analysis and observation skills by using Gagné's model of an instructional unit, Journal of Education for Teaching, 36:2, 197-210, DOI: [10.1080/02607471003651789](https://doi.org/10.1080/02607471003651789)

To link to this article: <https://doi.org/10.1080/02607471003651789>



Published online: 17 Mar 2010.



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Promoting student teachers' lesson analysis and observation skills by using Gagné's model of an instructional unit

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(Received 2 October 2009; final version received 13 January 2010)

This paper introduces a study of an experimental training methodology for promoting lesson analysis skills in student teachers. This methodology is based on the idea that the quality of lesson analysis skills depends mainly on teachers' perception of relevant instructional events and on their understanding of these events. The experimental intervention consists of student teachers' participation in sessions on guided analysis of videotaped lessons and writing lesson analysis reports. The experimental group progressed more than the control group. Gagné's model of an instructional unit is used as a theoretical framework for defining a lesson and identifying its critical events. The effectiveness of the proposed training approach was assessed on the basis of qualitative content analysis of lesson analysis reports written by student teachers in experimental and control groups at the beginning and end of their 10-week pedagogical school practicum. A comparison of progress made by the two groups was carried out in terms of the number of analytic idea units produced, categories of these units and their distribution across the relevant lesson events.

Keywords: lesson analysis skills; lesson observation; lesson models; instructional unit; student teachers' pre-service teacher education

Introduction

Promoting student and practicing teachers' lesson analysis and observation skills has always been considered a major element of teacher education. Panasuk and Sullivan point out that 'since the nature of a lesson is complex, it can be analysed from different positions' (1998, 330). Not surprising, therefore, existing empirical studies focus on all kind of issues related to teaching lessons and their analysis. For example, Eilam and Poyas (2006) investigated ways to promote student teachers' awareness of the characteristics of classroom complexity using video recordings, and Inoue (2009) pointed out in his study the importance of rehearsing instructional explanations before pre-service teachers start practice teaching. Many other studies related to classroom observation, are less specific on the content being analysed and focus on promoting teachers' reflective thinking in general (cf. Richert 1990; Williams and Watson 2004; White 2009; and others).

However, empirical studies, in which the promotion of lesson analysis and observation skills is based on specific instructional models, are less common. Typically authors of many studies do not even specify what they mean by a lesson in terms of instructional models. The emerging lesson study movement (e.g. Podhorsky and

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Fisher 2007) seems to be very promising for promoting teachers' lesson analysis skills, but its theoretical basis is still rather vague for use as a research framework (Davis and Dunnill 2008, 5).

A possible reason why researchers are rather disinterested in studying issues of developing lesson analysis skills in a comprehensive way (i.e. in the light of identified instructional models) and prefer to focus on promoting component skills is the fact that the notion of the lesson as an object of analysis is itself unclear (Krull 2008, 124). To avoid this shortcoming, we first specify the notion of lesson as used in our study, then analyse the suitability of instructional models for promoting lesson analysis skills and introduce our research findings on training student teachers' lesson analysis skills.

Theoretical background

Lesson as the unit of instruction

Principally, there are two main options for defining a lesson. One of them is seeing a lesson as a fixed period of time during which learning is intended to occur. The other option is to define a lesson as a sequence or unit of learner activities necessary for achieving the intended learning objectives (Gagné and Driscoll 1988, 116–17). Teaching from this last point of view means creating external conditions so that a pupil, in coping with them, acquires learning experiences (Tyler 1949). However, as pointed out by Stones (1984, 178), a teacher has to make 'a clear distinction between the analysis of the learner's task and the analysis of his [*sic*, the teacher's] task' for ensuring clarity of the pedagogical provision necessary for achieving the prescribed lesson objectives. The nature of these external conditions, or pedagogical provision in Stones' terms, may have different characters (starting with natural circumstances causing the acquisition of certain learning experiences and ending with highly prescriptive instructions for undertaking learning activities), but all lead to the acquisition of similar pupil learning experiences (Tyler 1949). Yet, the learner's motivation and cognitive and meta-cognitive processes (i.e. their psychological processes), which are necessary for learning to occur (i.e. the acquisition of learning experiences), remain the same in their nature. However, early models of school lessons, such as Johann Herbart's lesson steps or phases, described how teachers should teach rather than focusing on the pupils' internal processes of learning (Brubacher 1966, 213).

Models of instructional units

Towards the end of the twentieth century, instructional models developed by Madeline Hunter, Barak Rosenshine and Robert Gagné became those most widely used (Reyes 1990). Hunter's model described teacher activities in stages or phases necessary for supporting pupils' internal processes of learning, which she called 'elements of lesson' (Hunter 1982, 1991). Thanks to its practical orientation, Hunter's instructional model was extensively used in the 1980s and its effectiveness researched (Mandeville and Rivers 1988; Sparks 1988–89). However, none of the large-scale trials for preparing teachers using her instructional model produced a significant increase in student learning, a fact that made the use of the Hunter's model and its accompanying

methodological recommendations questionable as a direct guideline for lesson design (Berg and Clough 1991).

Another group of models of instruction is known as *direct instruction*. The underlying theory of this approach is based on Rosenshine's (1983) concept of teaching functions that he synthesised from different studies of effective teaching. As Rosenshine himself admits, his concept of teaching functions is most applicable to disciplines that are 'well structured' rather than those that are holistic and unstructured (Rosenhine 1983) and, therefore, it is dubious whether it can be considered as suitable for every teaching situation.

Gagné developed probably one of the most widely known contemporary models of instruction (Smith and Ragan 1996), which is based on the idea of supporting the students' psychological processes of learning. Its latest version identifies nine phases, or events, within an instructional unit necessary for supporting the internal processes of learning in their most probable order of occurrence. Certain instructional events require repetition to ensure effective learning (Gagné 1985; Gagné and Driscoll 1988, 118), the nine being:

- (1) gaining attention,
- (2) informing the learner of the learning objective,
- (3) stimulating recall of prior learning,
- (4) presenting the material for learning,
- (5) providing learning guidance,
- (6) eliciting performance,
- (7) providing feedback,
- (8) assessing performance, and
- (9) enhancing retention and transfer.

Gagné's model as a tool for training lesson analysis skills

In a study of teachers' perceptual and thinking skills, Krull, Oras and Sisask (2007) showed that when asked to comment on videotaped lessons, teachers noted classroom activities that can be identified as the 'instructional events' in Gagné's model. However, the study also revealed that expert teachers' perceptions and thinking, in terms of the quantity and relevance of comments, outperformed those of beginning teachers in all lesson events reflected in Gagné's model of the instructional unit. Additionally, two other categories of comments, beyond Gagné's model of the instructional unit, were identified that related to the organisation and management of general class activities and to the general teaching strategy and classroom atmosphere. Furthermore, the study confirmed that experienced teachers perceived teaching and learning more as a joint activity of teacher and pupils than do novice teachers.

The discovered 'deficiency' in novice teachers' professional perceptions and thinking of relevant lesson events in comparison with expert teachers, as shown above, inspired us to hypothesise that these capabilities can be purposefully developed. The training of lesson analysis skills, based on Gagné's model of instruction, was taken to be the most appropriate format for this purpose.

The aim of this study is therefore to investigate the impact of special training in lesson analysis and observation skills on student teachers' professional development during their pre-service school practice.

Research methodology

Design of the study

Our study followed a traditional experimental research design using pre-test/post-test procedures for identifying the progress of student teachers' competences of lesson observation through their written reports of lesson analyses. The students' lesson analysis skills were tested at the beginning and the end of their school practice by asking the students to analyse a videotaped lesson. During the pedagogical practicum, experimental and control groups were set up and treated differently, in the sense that the control group followed a traditional programme under the guidance of co-operating teachers, whereas the experimental group, in addition to conventional practicum activities, participated in three training sessions on lesson analysis skills.

Research subjects and context

The research subjects of this study were student teachers of Tartu University, Estonia, during their 10-week or 15 ECTS (European Credit Transfer System) points pre-service school practicum in 2007–08. The school practicum is a major component of Estonian pre-service teacher education and is regulated by National Framework Guidelines (Õpetajate 2000). The practicum took place in one block, starting with lesson observation and analysis under the supervision of co-operating teachers and ended with teaching specific subject lessons. The pedagogical preparation amounted to 60 ECTS points and was typically completed in the framework of a two-year master's programme. Other components of pedagogical preparation were studies of pedagogical theory, subject didactics and the completion of a diploma paper. In the case of students majoring in the teaching of many school subjects, additional courses on subject didactics and associated school practice were required (Krull 2007, 77–78).

The student teachers participated in the study (which was announced at the opening conference held before the school practice started for the entire cohort) on a voluntary basis. Initially, it was proposed that 15 prospective secondary school teachers would participate in the experimental group and the same number of students in the control group (from 35–50 prospective subject teachers yearly undertaking their school practice in partner schools). However, no restrictions were made for other student teachers to join the experimental group in order not to deny learning experiences to students who would find them useful for their professional development.

Eventually, a total of 12 student teachers from the experimental group who submitted their initial and final lesson analysis reports and participated in the training sessions were considered as belonging to this group. In the control group, properly prepared initial and final analyses were submitted by 10 students. The actual final experimental group consisted of four mother tongue language and literature teachers, four teachers of history, two of sciences, one of Russian and one of chemistry. The control group involved five mother tongue language and literature teachers, two teachers of chemistry, two of English and one of history.

Pre- and post-test of lesson analysis skills

The pre- and post-test and the training of lesson analysis skills were based on using online tools and materials. The pre- and post-test website provided student teachers

with short instructions for completing the task, introduced the theme and structure of the lesson to be analysed, and listed four questions to be answered when analysing the lesson. These questions were:

- (1) Which relevant events (in terms of teacher and/or pupil activities) were present in the observed sections of the recorded lesson?
- (2) What was missing in this lesson?
- (3) What was exemplary in this lesson?
- (4) What is your overall assessment for this lesson?

In addition, the website provided access to sections of the videotaped grade seven (i.e. pupils aged 12 to 13) mother tongue language lesson to be analysed (18 minutes from the beginning and seven minutes from the end) of a transcription of teacher and pupil utterances during this lesson, and a form on which to write a report of the lesson analysed. A conventional mother-tongue lesson was considered by the researchers as the most appropriate for student teachers of different subjects to examine as the basic ideas of Estonian grammar were very familiar to all graduates of secondary schools. The pre- and post-test of lesson analysis skills began in the computer lab with the introduction of the task to the students and with a joint viewing of the lesson recording. Next, the students individually viewed the online lesson recording, taking notes for later analytical comment on lesson events, preparing a report and submitting the report online. The students were free to undertake these tasks in locations that were most convenient for them, the only stipulation being that they submitted their completed lesson analysis reports within 48 hours.

Training of lesson analysis skills

The training for lesson analysis skills consisted of student teachers attending special seminars with subsequent independent work for writing lesson analysis reports. At the beginning of the first seminar, the researchers introduced Gagné's model of the instructional unit and its modified version to the students, pointing to class management aspects and to creating a learning atmosphere in instructional activities. Next, the researchers asked students to analyse a videotaped lesson (not used for pre- and post-test purposes) by answering nine questions. Four questions were used and asked student teachers to describe the structure of the lesson to be analysed, its general organisation of the work and atmosphere, and to give a general assessment for this lesson and its preparation. The five remaining questions asked students to identify relevant lesson events that were delivered and/or ignored in this lesson, to assess the quality and teacher's awareness of the delivered lesson events, and to describe alternatives to the teacher's way of delivering the relevant lesson events.

In the next two seminars, the problems related to the application of Gagné's model to lesson analysis were discussed. Also, students received feedback on the quality of their previously submitted lesson analyses. In all three seminars, the researchers introduced students to the nature and structure of lessons to be analysed and provided examples for identifying categories of instructional events. The students were required to submit their lesson analysis reports within 72 hours. All study aids and materials necessary for this work were available online.

The lessons used in training sessions one and two were taught by expert teachers (history in grade five and mother tongue in grade nine). In the third training session,

student teachers could choose between two lesson recordings (history in grade six and mother tongue in grade 10) taught by themselves or by their colleagues.

Data analysis

The student teachers' lesson analysis reports produced in the framework of pre- and post-testing were processed using qualitative content analysis methods with statistical comparison of identified categories of idea units. The qualitative content analysis was carried out in three stages. In stage one, student teachers' comments in their lesson analyses were divided into idea units. In stage two, the identified idea units were broken down into categories of lesson events. In stage three, the idea units were additionally identified as talk about teaching, learning, or joint leaning-teaching activities.

Identification of idea units

As the definition of idea units, (or units of meaning necessary for qualitative content analysis) has always been a difficult task, the researchers critically examined many former studies that had defined these units more or less explicitly for the analysis of instructional activities (e.g. Sato et al. 1993; Lee 2005; Krull et al. 2007). Based on these studies, an idea unit was defined as a trainee's *statement*, which is a semantic entity, either a (part) sentence or a sequence of sentences, dealing with one specific, observed phenomenon in the class activities. For example, a complex comment such as:

At the beginning of (independent) work, she (the teacher) is dealing with her own stuff,/ then she walks around the classroom,/ answers pupils' questions,/ gives the textbook to a pupil/ without disturbing the rest of the class/

was divided into five idea units, separated with slashes in this example. (In this and in all following examples that originate from submitted reports, student teachers' comments are in italics.) Or, as in another comment:

The class starts to check the assignment/ and the teacher praises everybody who gives the right answer/

was broken into two idea units.

In this study, the researchers split the comments in the student teachers' lesson analysis reports into idea units, first individually and then consolidated their decisions in pairs. The reliability of splitting the comments into meaningful idea units was checked in pre- and post-test lesson analysis reports, using a randomly selected student teacher from the experimental group. The average percentage of coincidence between the two researchers, over two reports, was 86.6%, which was considered relatively high for coding in qualitative content analysis (e.g. Miles and Huberman 1994, 64).

Categorisation of idea units

In order to consider the lesson analysis reports as more or less comprehensive reflections of relevant events and aspects for the success of an observed lesson, we adopted the nine-category list of major instructional or lesson events (see Table 1) developed by Krull et al. (2007). In this list, seven positions (labelled as G1–G7) point to the

Table 1. Categories of main instructional events and activities used for the analysis of student teachers' comments.

Code	Description of the instructional events	Examples of students' comments
G1	Gaining pupils' attention	<i>Making pupils to stand up at the beginning signals to them that the lesson has commenced and that they should focus their attention on the teacher.</i>
G2	Informing the pupils of the objectives of learning and motivating learning	<i>The teacher did not directly inform pupils about the objective or theme of the lesson.</i>
G3	Stimulating recall of prior learning	<i>When it appeared (on the basis of questioning) that everybody has mastered the previous topic ...</i>
G4	Presenting the stimulus (learning information)	<i>Pupils had to find information on the new topic independently.</i>
G5	Providing learning guidance for supporting semantic coding in pupils	<i>The teacher was supporting pupils when they were independently studying the new topic.</i>
G6	Checking achievement of learning objectives by eliciting performance from pupils and providing feedback	<i>The teacher could not be absolutely sure that the slower pupils managed to correct their answers ...</i>
G7	Enhancing retention and transfer of what has been learned	<i>The teacher gave a new assignment for promoting the retention and generalisation of the learned topic.</i>
M8	Organisation and management of general class activities	<i>Teacher asked pupils to distribute handouts (for the following individual work).</i>
Y9	General teaching strategy and classroom atmosphere	<i>The pupils started to work in a businesslike and positive mood.</i>

instructional events in Gagné's model, with three events (eliciting performance, providing feedback and assessing performance) collapsed into one category of enhancing retention (G6). This was considered necessary because comments on these events are typically too few in number to be considered as separate categories. The remaining two categories, organisation and management (labelled as M8) and general teaching strategy (Y9), point to aspects of teaching that are not directly related to students' individual learning processes but rather play an important role for successful teaching in class.

To ensure a similar understanding of categories by researchers, a reading guide, defining the categories of lesson events, was compiled. The researchers first categorised the idea units in all lesson analysis reports individually and then typically consolidated their divergent decisions in meetings organised for revising the individual discrepancies. When individually categorised, the percentages of coincidence ranged from 74% to 94% in 10 randomly selected reports for one pair of two experts. The average rate of coincidence of the appointed categories was 86%, and the consensus between the pairs of researchers was achieved at about the same level for these reports. The categorisation of idea units into talk about teaching, learning or joint teaching-learning activities, did not cause major disagreements, and an average consensus of 97.3% was achieved among researchers in the case of 12 randomly selected reports.

After consolidating the categorisation of student teachers' comments in their lesson analysis reports, the texts were supplied with category labels and other coding symbols and were sorted and screened using Microsoft Excel. All quantified data were collected into a database, which was statistically analysed using STATISTICA program packages. The quantities of words and idea units were determined in the lesson analysis reports for three options: total number of words and idea units in all comments, in current comments when observing the lesson, and in general comments after observation.

Results

Analysis of the average number of words

There were big individual differences in the quantity of words in the initial and final lesson analysis reports. The minimum number of words in the initial analyses was 176 and the maximum was 1100, while in the post-analyses these figures were 192 and 895 respectively. The data analysis showed that the average number of words, taken jointly for the experimental and control groups, increased both in the case of total number of words as well as in the case of only direct comments on the classroom activities. In the first case, the average number of words increased from 445 to 520, and in the latter case from 321 to 363 (Table 2). The comparison of the average numbers of words produced in the analyses, calculated separately for experimental and control groups, revealed no significant differences in the case of the pre-test, which confirmed that the groups were equal in this sense. No significant changes were discovered in the average numbers of words in the post-test either.

The separate analysis of changes in the average number of words between pre- and post-analyses for experimental and control groups showed that in the experimental group the number of words mostly increased, but none of these changes were statistically significant. Surprisingly, the average numbers of words in the post-test reports increased significantly in the control group, except for comments on current class activities.

Analysis of idea units and their categories

A preliminary analysis of idea units produced in the initial and final lesson analysis reports revealed, like in the analysis of words, that there were significant individual differences between participating students. For example, the individual sums of idea

Table 2. Changes in the average numbers of words in all/ current/ and general comments in the pre- and post-test lesson analysis reports.

	Initial analysis reports	Final lesson analysis reports	p< (Wilcoxon matched pairs test)
Both research groups	444.9/320.8/124.1*	520.0/363.3/156.7	0.07/0.18/0.26
Exp. group	465.6/343.7/121.9	507.2/385.9/121.3	0.53/0.29/0.53
Contr. group	420.2/293.4/126.8	535.4/336.2/199.2	0.05/0.38/0.05

*Figures in the triads pertain to the average number of words in all comments per student, in current comments, and in general comments after lesson observation respectively.

units produced in the initial analyses varied from 41 to 166 and for final analyses from 42 to 145. However, practically no differences were found between the average numbers of idea units produced in the initial analyses (79 for the experimental group and 77.9 for the control group) or in the post analyses (88.2 and 88.3 idea units correspondingly). This condition imposed a necessity to normalise the data on idea units in the initial and final lesson analysis reports. To this end, all individual figures of idea units per categories were corrected, dividing them by a coefficient determined as the ratio of the average number of idea units in lesson analysis reports (for experimental and control groups taken together) to students' individual scores of idea units. This correction procedure was applied separately for data drawn from initial and final lesson analyses. The following analysis of categorised idea units is based on normalised data.

The comparison of average numbers of identified idea units per categories in the initial lesson analyses revealed that the experimental and control groups were almost equal, as no significant differences were discovered in the average numbers of categories. The figures characterising the post-lesson analyses showed that the average number of idea units categorised as motivating students (G2), recalling prior learning (G3), presenting new information (G4), providing learning guidance (G5), eliciting pupils' performance along with feedback (G6) and comments on classroom atmosphere (Y9) increased in the experimental group in comparison with the control group. However, the difference was statistically significant ($p > 0.05$) only in the case of providing learning guidance (6.1 idea units on average against 3.9 in the control group). Conversely, the number of idea units categorised as classroom management (M8) was significantly higher in the control group (45.2 against 36.6 in the experimental group). Furthermore, the comparison of average numbers of idea units in the pre- and post-test reports of the control group revealed that this was the only category in which the number of produced idea units increased significantly (from the initial 40.2 to 45.2; $p < 0.02$). The same analysis performed for the experimental group revealed that the average number of idea units produced by this group increased significantly for two categories in terms of the total amount of idea units as well as in terms of the current comments on observed lessons (Table 3).

The average number of categorised idea units increased for guidance of learning from 4.3 to 6.1 and for eliciting performance and providing feedback from 5.8 to 9.5 regarding students' current and general comments. There were also other positive changes in perception of promoting retention and transfer of learning in both groups, but the differences between average values were not statistically significant.

Table 3. Changes in average numbers of categorised idea units in comments by members of the experimental group.

	All idea units in comments			Idea units in current comments		
	Final analysis	Initial analysis	$p < *$	Final analysis	Initial analysis	$p < *$
G5	6.06	4.28	0.02	4.91	3.59	0.05
G6	9.45	5.82	0.03	8.21	5.05	0.02

*Wilcoxon matched pairs test.

Changes in sensitivity towards teaching, learning and joint learning–teaching activities

The analysis of idea units categorised as talk about teaching, learning and joint learning–teaching activities revealed that significant changes appeared in the ratios of these units produced by the experimental group, but less so in the control group (Table 4). The share of idea units pertaining to joint teaching–learning activities increases significantly along with increasing teaching experience from 13.2 to 20.7 only in the experimental group. Though all the differences between idea units produced in the initial and final analyses are not all statistically significant for the experimental or control groups, a developmental trend for a better perception of lesson events pertaining to pupils' learning and joint activities of teaching–learning is obvious.

Attitudes towards the training of lesson analysis skills and knowledge of theory

The student teachers of the experimental group held very positive attitudes toward receiving special training for their lesson analysis skills. They submitted 33 of 36 potential reports on lesson analysis required in the three training sessions. Yet a quiz of the students' knowledge of the adopted model of lesson analysis, carried out at the beginning of the third training session, did not confirm mastery of this approach. The researchers asked the students to define, in their own words, the categories of lesson events of Gagné's instructional model along with additional categories pertaining to general classroom management and atmosphere. Only four of seven students who participated in this session were able to describe what the nine categories meant at a satisfactory or higher level. The results were startling considering the fact that the main features of this model of the instructional unit were taught in the course on educational psychology and rehearsed at the beginning of the two previous training sessions.

Discussion and conclusions

The results of this study showed that the student teachers' perception and thinking of the lesson events that play critical roles in successful teaching increased in the case of the experimental group. The number of comments increased in six of the nine categories with five of these categories pertaining to events directly influencing learning

Table 4. Changes in the sensitivity towards instructional (T), learning (L) and joint teaching–learning activities (T/L).

	Experimental and control groups taken together		Experimental group		Control group	
	Diff.	p<*	Diff.	p<*	Diff.	p<*
T	48.0–47.0**	0.41	51.2–51.9	0.70	44.2–41.1	0.34
L	18.4–14.5	0.03	15.6–12.4	0.10	21.8–17.0	0.06
T/L	21.3–16.4	0.04	20.7–13.2	0.04	22.1–20.4	0.51

*Wilcoxon matched pairs test.

**The first figure in the subtraction formula stands for average numbers of idea units in the final analyses and the subtracted figure for the initial analyses.

and one to classroom atmosphere. In particular, the sensitivity of the student teachers in the experimental group increased significantly regarding their perception and thinking about activities related to the guidance of learning and eliciting and assessing pupils' learning. In addition, the members of the experimental group developed a higher sensitivity towards incidences of joint learning and teaching events. This can be interpreted as a progress in their professional skills, as expert teachers typically notice more frequently joint activities of learning-teaching than novice teachers (Krull et al. 2007). In the control group, the student teachers sensitivity increased only towards teaching activities related to class management.

In another study examining how to promote lesson analysis skills, Santagata, Zannoni and Stigler (2007) asked student teachers to analyse three video-recorded lessons of mathematics three times from different perspectives. First, the students commented on goal(s) and parts of the lesson, next on student learning and finally on teaching alternatives. The changes in student teachers' comments were assessed as pertaining to elaboration, mathematics content, student learning, critical approach and alternative strategies to teaching. The comparison of comments by these categories at the beginning and end of training sessions revealed that the ability to analyse instruction improved significantly in all these perspectives. However, because the central concept of a 'lesson' was conceived very differently in this study, it is difficult to draw parallels in detail. Nevertheless, there were some similarities between the two studies. For example, Santagata and her colleagues found that the average number of comments in the pre- and post-test analyses remained practically the same. It was also discovered that the training of lesson analysis skills increased the student teachers' sensitivity towards learning and joint activities of learning and teaching.

A relatively modest progress achieved in student teachers' lesson analysis skills in our study could be explained as related to the student teachers' difficulty of integrating their practical observations and thinking with theory. The issue of bridging the gap between theory and practice has been an eternal problem in teacher education and investigated by numerous outstanding scholars in the field (Brouwer and Korthagen 2005). When a theory (like Gagné's model of instructional events, typically taught in courses of educational psychology) and specific appearances of these events in practice exist separately for student teachers, the theory as a logical tool for analysing practice would, instead of sharpening sensitivity towards certain phenomena, blunt it (Krull 2008, 135). Furthermore, as characterised by Berliner's (1994) model of teacher professional development, novice teachers tend to follow context-free rules in their teaching, and real-world experiences often appear to them as more important than theoretical ideas. It was quite possible that occasionally the student teachers' modest mastery of Gagné's model limited their capability to perceive nuances in the observed lesson rather than empowered it. This would be an explanation as to why the student teachers of the control group, whose thinking was not limited or restricted by a specific instructional model, were more talkative in their final reports.

The other reason was obviously related to the researchers' training ideology and procedures. This presented a dilemma during the design stage as to whether to train student teachers to recognise specific lesson events together with pointing them out in the analyses (a strategy that ensures fast but formal learning), or to use Gagné's model as a framework for lesson analysis (a strategy that puts emphasis on learning with understanding). The last strategy was taken as the most adequate for pursuing the

goals, and thus student teachers were not required to learn by rote the list of major instructional events along with their definitions in the model. Yet, all submitted lesson analysis reports were accepted that commented on the lesson to be analysed, without the requirement that the students focused on identifying specific lesson events as defined by Gagné's model. The researchers' thinking was that the conditions for student teachers' professional growth were most favourable if they themselves developed their awareness of the usefulness of the introduced instructional model and made decisions as to what extent they relied on the model in their lesson analyses.

Of course, this approach did not rule out the possibility that there were other reasons for skills increasing, besides the special training of lesson analysis skills based on Gagné's model for student thinking and perceptions. For example, the students of the experimental group had more opportunities to train their lesson analysis skills than did the control group. However, the fact that the members of the experimental group started to categorise and label their comments in the lesson analysis reports without any initiative on behalf of the researchers rather supported the idea that the student teachers were using Gagné's model when analysing the lessons. Yet, the research design used might leave room for an interpretation that allowed one group of students to fall behind the other, but this obviously was not the case as the positive output of this study was hypothetical in its designing phase. Furthermore, there were no restrictions on any student teacher joining the experimental group. Certainly, the training methodology, along with issues of ensuring mastery of the conceptual model underlying the training, especially the effectiveness of Gagné's model as a particular tool used in this training, calls for further research and elaboration before recommending this approach for general use in teacher education.

Other limitations of this study related to the incoherence between the subject of lessons to be analysed and student teachers' speciality. As a mother-tongue lesson was used for pre- and post-testing, the identification of lesson events could be more complicated for the science student teachers than for those from the humanities. Also, comparison of the two groups was complicated by non-identical distribution of subject areas in experimental and control groups and the selection of lessons to be analysed being not always drawn from the students' own subject domains. So, on the one hand, these mismatches could be seen as weaknesses of this study but on the other hand, at least two reasons justifying this practice could be put forward:

- (1) Gagné's instructional model defines lesson events in psychological terms and, therefore, interpretation of lesson events from the perspectives of different school subjects fosters the student teachers' understanding of their role in promoting pupils' learning; and
- (2) university tutors of general pedagogy supervising school practicum often work with student teachers of different subject domains. When working with these students in seminars, the tutors have no other choice but to analyse lessons that do not always correspond to subject areas of all students in the group.

There was a possibility that the student teachers' perception of lesson events progressed less when there was a mismatch between their speciality and subject of lessons to be analysed but on the other hand, this situation was closer to the real context of teacher education. Of course, further research in more rigorous conditions would be desirable. Finally, the small samples of student teachers in the control and

experimental groups mitigated against making far-reaching conclusions generalised to other contexts.

This study can be considered as a step towards creating a methodology for training student teachers' lesson analysis and observation skills on the basis of instructional models that considers teaching as an activity aimed at creating external conditions for supporting pupils' internal learning processes. These models are most useful if taken as framework guidelines for instructional design and analysis, rather than used as step-by-step recipes for lesson design. Finally, this study has provided the opportunity to see instructional models as analytic tools in an emerging lesson study movement.

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