Teachers' Perception of Instructional Events: Differences Between Novices and Experts

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Introduction

It is obvious that there are differences in perceptual capabilities of novice and expert teachers. For example, expert teachers have much more higher sensitivity towards certain lesson events than novice teachers do. In fact, dependence of teachers' perceptual capabilities, pedagogical knowledge and thinking processes on their school experience has been extensively studied (Berliner 1987, Kagan 1992). However, these studies have not yet produced reliable and easy applicable indicators of teachers' expertise. The availability of these indicators would be beneficial for discriminating between a novice and expert teachers on the basis of special tests.

Previous studies have shown that teaching expertise develops in a similar way with professional growth in other fields like chess playing (Chi 1988) or making diagnoses on the basis of X-ray pictures (Lesgold et al. 1988). Relying on the concept of professional development introduced by Dreyfus and Dreyfus (1986), Berliner elaborated a model describing the development of teacher expertise development in five-stages. The main features of these stages are as follows (Berliner 1987).

1. Novice level. A novice's professional knowledge is context-free. There are some simple and context-free rules, which are used by the novice when making decisions.
2. Advanced beginner's level. Experience becomes melded with personal theoretical knowledge. An advanced beginner starts to realize the limitations of rules but has still difficulties in discriminating between what is important and what is unimportant.
3. Competent level. A competent teacher makes decisions consciously and starts to recognize what is important and what less important.
4. Proficient level. – intuitive knowledge starts to play a significant role in making decisions, encountered events and situations are perceived in a holistic manner, in the classroom, analogies are perceived, but the decision-making is still analytic and deliberative;
5. Expert level – the expert teacher perceives situations and finds solutions intuitively, acts flexibly, develops automaticity in his or her behaviour to allow the solving of more complex or unusual problems appearing in the instructional process.

Only the representatives of the two most contrasting teacher experience groups – novice teachers with no or few teaching experience and expert teachers – were compared in most of these investigations (see e. g. Even et al. 1993, Hogan et al. 2003, Sato 1993, Schempp et al. 1988).

In studies where the novice and expert techers are compared, novices are usually without any teaching experience, but wish to become a teacher – student teachers or students of teachers' training courses. The expert teachers are the real experts of teaching whose vocational skills have developed throughout long years of practice. However, the identification of expert teachers is not very easy as expertise is not only dependent upon the duration of the practice in school, but also on the process of learning from experience. As John Dewey (1933) pointed out, experience could be educative or miseducative. There is no guarantee that a teacher who teaches from day to day in a similar way, without reflection, improves professionally.

There are various methods to compare the abilities of novice and expert teachers. For example, Beijaard and his colleagues (2000) carried out interviews to study novice and expert teachers' perceptions of professional identity, Berliner and his colleagues (1988) compared novice and expert teachers in prediction of students' knowledges and Sabers et al. (1991) in perception of static and dynamic lesson events. Sato and his colleagues (1993) had studied differences between novice and expert teachers' perceptional capabilities. The latter study has

been the basis of the methodology used in the study carried out in the University of Tartu.

One possibility to learn differences in teachers' perceptions is to ask teachers to comment on lesson events. The research subjects in the related experiments were shown slide sequences or videotapes made of lesson and they were asked to comment on what they were seeing. These methods have been used for example by Berliner et al. (1988) and by Sato et al. (1993). Berliner and his colleagues used photographic slides which had been made of two secondary class sessions in one study, and a videotape of a junior high science classroom in another study. Sato (1993) and his colleagues also used a videotaped lesson as a stimulus material.

In their study, Japanese researchers (Sato et al. 1993) requested that expert and novice teachers watch a videotaped lesson without stopping it and that they think aloud about their perceptions and feelings. The expert and novice teachers' comments were compared. The analysis revealed some characteristic features of "practical thinking style" that distinguish expert teachers from novice teachers. For example, the expert teachers produced more idea units in their comments than novice teachers did and only small amount of the expert teachers' comments were "facts" while in the novices' comments more than 70 % of the idea units were merely "facts".

Using the lesson as a stimulus material, it can be analysed proceeding from a well known model of instructional events. Such analysis provides a benchmark for categorising the comments of the research subjects. One of the well known model of instructional events is Gagné's model of instuctional events (Gagne and Driscoll 1988, 118-127), which presents the events of the lesson occurring in the following order:

1. Gaining attention;
2. Informing the learner of the objective (the aim of the learning);
3. Stimulating recall of prior learning;
4. Presenting the stimulus. The stimulus may be a printed text, an audio message containing the content;
5. Providing learning guidance;
6. Eliciting performance (to assure that learning does indeed occur);
7. Providing feedback;
8. Assessing performance;
9. Enhancing retention and transfer;

The presented model also served as a basis for the Estonian study of developing a list of categories of the comments of the research subjects.

The aim of the study is to uncover and define indicators of differences in novice and expert teachers' perceptual capabilities. These differences are expected to reflect teachers' levels of professional development.

Research methodology

Participants

The subjects of the experiment were novices and experienced (expert) teachers. Novices were students of teachers' training course who had not been occupied as teachers. On the basis of literature on the identification of expert teachers, the primary criterion of choosing the test subjects was teaching practice of at least ten years. The ten-year teaching census was introduced on the basis of a national survey, which showed that Estonian teachers' understanding of many basic educational issues (like class management, student motivation, etc.) typically stabilises in the teachers' 8-10th years of teaching (Krull 2003).

As a second condition in the procedure of identifying expert teachers was that the teachers were certified as teacher-methodologists. Thirdly, these teachers had to be recognised as good teachers at their own schools. The principals or vice-principals were asked to assess the teacher-methodologists' communication skills with students, their individual approach to the students in the teaching and studying process and their ability in creating a favourable and motivated study environment.

Eventually, five novice teachers and five expert teachers were asked to participate in the experiment.

Research design

In the research that was carried out in Tartu University a research design similar to the study by Sato et al (1993) was used. The subjects of the experiment were shown a videotaped lesson of the Estonian language in grade seven, and while watching, they were asked to comment on moments and events that caught their attention. The comments were tape-recorded and later transcribed. The main difference between Japanese and Estonian research designs are the slightly different study conditions. Estonian teachers who accepted to participate in the study were invited to watch the lesson recording and to comment on it in a room equipped with the necessary equipment at the Department of Education. In Japan, the lesson recordings were sent to the teachers by mail and Japanese teachers carried out the experimental study by themselves.

Methodology for the analysis of teacher comments

Dividing texts into "idea units" (a term used by Sato et al. 1993) and their classification into categories were the next steps of the research. The methodology of Sato et al (1993) was initially followed, according to which the comments of the research subjects were divided into idea units and thereafter the idea units about teaching and learning were analyzed separately.

The categorizing method used by Sato et al. (1993) can be described as follows:

- The subjects' comments were divided into (idea)units.
- First, it was determined whether the unit was about teaching or learning and then, in turn, whether it was a fact, impression or interpretation.
- Besides that, the idea units emerging in the comments were categorized according to significance and relevance.

Despite following the methodology, the categorizing of idea units often appeared to be unreliable in the Estonian circumstances. It was found that the idea units should express integral ideas and not be limited to single sentences as defined by Sato et al. (1993). After multiple experimentations with different definitions of idea units and different models of categorization the modified methodology of analysis based on Gagné's model of instructional events was elaborated. In case of every comment it was decided which instructional event it was about and whether it was a fact or an interpretation.

During the analysis, difficulties appeared in differentiating between some instructional events; at the same time it became clear that Gagné's model does not comprise some teaching- and learning-related points that caught the eye of the research subjects: for example, the interior of the classroom, organizational actions, atmosphere of the classroom (spirits) etc. Thus, two new categories were added, which treat (1) the concrete organizational actions in class or (2) the general organization of study work.

The development of the new methodology can be described by the following aspects:

1. The stimulating material – the videotape of the class – was divided into components according to Gagné's model of instructional events in order to decide more easily which stage of the class the subject's comment belonged to.
2. Thereafter the comments, tape-recorded during the lesson observation, were transcribed and the text was divided into segments according to expressed ideas. The comments were equipped with a time scale so that while categorizing them, it would be possible to compare the subject's text with the class recording, which was the basis for the experiment. In order to simplify the coding/ categorizing of idea units, a coding table was used together with texts describing the categories. It appeared that one comment could sometimes reflect several instructional events.
3. Gagné's model was replaced with a simplified version, where some instructional events were merged (like checking, giving feedback and assessing learning results were now viewed as the category of "checking"), for the text analysis proved that those stages were often overlapping or very hard to distinguish in the subjects' comments.
4. The subjects' comments were re-structured in a way that one code generally corresponded to one idea unit. In a few cases the text corresponded to many different categories. In order to simplify the data analysis the comments which described several instructional events were identified as belonging to different categories.
5. When difficulty aroused in deciding whether an idea unit can be classified as any of Gagné's instructional events or as an organizational action, the original classification was preferred.
6. The analysis proved that comments can often be classified as inappropriate, irrelevant, and significant. It was decided that the relevance (significance) would only be determined about comments viewed as interpretations.

At first, four researchers individually categorized all the idea units. After that, in order to increase the reliability of categorizing, a consensus-based deciding was applied.

Research findings and discussion

The analysis of the teachers' comments revealed that some statistically significant differences between expert and novice teachers in the perception of instructional events exist. This confirmed the findings of many other studies (Beijaard 2000, Berliner et al. 1988, Even et al. 1993, Sabers et al. 1991, Sato et al. 1993). In this study, the major differences appeared in providing learning guidance for supporting semantic coding in pupils, where the expert teachers interpreted the videotaped lesson more frequently and precisely. The expert teachers made an average of 3.2 remarks while the novice teachers made 1.6 remarks. Almost all comments of the expert teachers were relevant while only half of those of the novice teachers could be considered relevant. In noticing the facts concerning providing learning guidance no significant differences occurred between novice and expert teachers. However, in commenting on presenting learning information, differences only occurred in the amount of commented facts; on the average, the expert teachers produced 6 factual comments on teaching new material while the novice teachers produced 1.8 comments.

On enhancing retention and transfer of what has been learned, a statistically significant difference in mean numbers of comments appeared only in the case of relevant interpretative comments. On the average, the expert teachers produced 3.0 and the novice teachers 0.6 comments.

On the general teaching strategy the expert teachers produced the average of 9.8 and the novice teachers 2.2 relevant interpretations.

The expert teachers perceive significantly more details and characteristic features in the observed instructional events. It is similar to Japanese study (Sato et al. 1993) where the expert teachers produced more idea units in their comments than novice teachers did.

Conclusions

Drawing on the methodology of Sato and his colleagues a modified methodology of content analysis was elaborated that enabled to categorize and analyze Estonian novice and expert teachers' comments on the classroom events. The expert teachers have significantly higher sensitivity towards teacher activities related to (1) presenting new material, (2) guiding pupils' learning and (3) enhancing retention and transfer and (4) general teaching strategy and classroom atmosphere than novice teachers. These conclusions on differences are made on the basis of studying a small number of novice and expert teachers. The follow-up study with a larger group of research subjects might focus only on teachers' comments on the instructional events that had discriminated teachers by their expertise.

References

Beijaard, D., Verloop, N. and Vermont, J.D. (2000), 'Teachers' perceptions of professional identity: an explanatory study from personal knowledge perspective' in: *Teaching and Teacher Education,* 16, 749-764.

Berliner, D. C. (1987), 'In pursuit of the expert pedagogue' in: *Educational Researcher,*15, 5-13.

Berliner, D. C., Stein, P., Sabers, D., Clarridge, P. B., Cushing, K. and Pinnegar, S. (1988), 'Implications of research on pedagogical expertise and experience for mathematics teaching' in: Grouws, D.A. and Cooney, T.J. (eds), *Perspectives on research on effective mathematics teaching,* Reston, VI, National Council of Teachers Mathematics.

Chi, M.T.H., Glaser, R. and Farr, M. (1988), *The nature of expertise*. Hillsdale, NJ, Erlbaum.

Dewey, J. (1933), *How we think: A restatement of the relation of reflective thinking to the educativ process,* Chicago, Henry Regnery.

Dreyfus, H. L. and Dreyfus, S. E. (1986), *Mind over machine,* New York, Free Press.

Even, R., Tirosh, D. and Robinson, N. (1993), 'Connectedness in teaching equivalent algebraic expressions: Novice versus expert teachers' in: *Mathematics Education Research Journal,* 5, 1, 50-59.

Gagné, R. M. and Driscoll, M. P. (1988), *Essentials of learning for instruction*, 2nd ed. , Englewood Cliffs, New Jersey, Prentice Hall.

Hogan, T., Rabinowitz, M. and Craven, J.A. III (2003), 'Representation in teaching: Inferences from research of expert and novice teachers, in: *Educational Psychologist,* 38, 4, 235-247.

Kagan, D. M. (1992), 'Professional growth among preservice and beginning teachers' in: *Review of Educational Research,* Vol. 62, No. 2, 129-169.

Krull, E. (2003), 'Changes in teachers' attitudes and beliefs depending on their school experience' in: Linnasaari, H. (ed.), *Didacta Varia,* Vol. 8 (1), 105-120, Helsinkin Yliopisto Opettajankoulutuslaitos.

Lesgold, A., Rubinson, H., Feltovitch, P., Glaser, R., Klopfer, D. and Wang, Y. (1988), Expertise in a complex skill: Diagnosis x-ray pictures' in: Chi, M.T.H., Glaser, R. and Farr, M. (eds), *The nature of expertise*, 311-342, Hillsdale, NJ.

Sabers, D., Cushing, K. and Berliner, D.C. (1991), 'Differences among teachers in task characterized by simultanity, multidimensionality and immediacy' in: *American Educational Research Journal,* vol. 28, 63-88.

Sato, M., Akita, K. and Iwakawa, N. (1993), 'Practical thinking styles of teachers: A comparative study of expert and novice thought process and its implications for rethinking teacher education in Japan' in: *Peabody Journal of Education,* 68, 100-110.

Schempp, P., Tan, S., Manross, D. and Fincher, M. (1988), 'Differences in novice and competent teachers' knowledge' in: *Teachers and Teaching: Theory and Practice,* 4, 1, 9-20.