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TEACHER REFLECTION: WHAT IT IS AND WHAT IT DOES

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Brief cv

Fred Korthagen is a professor of education in the Netherlands, specializing in the professional development of teachers and teacher educators. In 2000 and 2006, he received the *Exemplary Research in Teaching and Teacher Education Award* from AERA Division K. In 2009 he received the *Distinguished Research Award* from the ATE.

TEACHER REFLECTION: WHAT IT IS AND WHAT IT DOES

Abstract

Rigorous research on outcomes of promoting reflection is rare. Moreover, as conceptualizations of reflection depend on underlying philosophies of education, many claims about effects of promoting reflection are questionable. A few research studies do show positive effects on supervisory discourse and journal writing, although school contexts often have a limiting influence.

Our own research, which included a longitudinal study, showed effects on the quality of graduates' interpersonal relationships with students, adequacy of perception of these relationships, and job satisfaction. These were mainly long-term effects. During their first half year of teaching, graduates initially seem to go through a latency period in which the ability to reflect disappears. Moreover, differences in outcomes are related to learning orientations. Students' learning orientations were investigated by means of the IEO test, which showed correlations between reflective attitude and age, previous schooling and gender. Consequences for teacher education and research are discussed.

TEACHER REFLECTION: WHAT IT IS AND WHAT IT DOES

Introduction

As Gore (1987) stated, since the beginning of the 1980s, almost all teacher educators have adopted the concept of reflection and consider it central to teacher learning. However, a shocking discovery one can do when screening the international literature on the issue of promoting reflection, is that there is very little high quality research on the effectiveness of teacher education programs aiming at the promotion of reflection. Even if we assume that promoting reflection is effective, one may well ask: effective towards what end? When we pose this question, we enter an area populated more by beliefs and convictions than by strong empirical evidence. Many studies rely heavily on comments made by student teachers during course evaluations, as well as on self-reports, general observations and isolated anecdotes. Cochran-Smith and Zeichner (2005) show that this lack of solid evidence is a more general problem in the research on the pedagogy of teacher education.

In section 2, we will analyze the causes of this lack of rigorous research. In section 3 we will discuss a few exceptions: research studies that did yield some empirical evidence regarding outcomes of promoting reflection. In the next sections, we will describe our own research on the promotion of reflection. Finally, we will discuss our conclusions and put forward suggestions for the pedagogy of teacher education and for further research.

Conceptualizing reflection

A major problem in trying to synthesize the research on effects of promoting reflection, is the difficulty of how to conceptualize reflection. Almost all researchers agree on the fact that reflection is a special form of thought (Grimmett, 1988; Hatton & Smith, 1995), and that the origin of the concept lies in the work of Dewey (1933), who warned against too mechanical a

focus on teaching methods in the preparation of teachers (see also Gore, 1987). In spite of this common origin, modern views of reflection differ substantially, if made explicit at all (Day, 1999; Hatton & Smith, 1995). We will give some examples illustrating the variety of notions that can be found in this area.

An author often quoted is Schön (1983, 1987). He distinguishes between *reflection-in-action* and *reflection-on-action*. Schön states that reflection-in-action and experimentation go together:

“When someone reflects-in-action, he becomes a researcher in the practice context. He is not dependent on the categories of established theory and technique, but constructs a new theory of the unique case. His inquiry is not limited to a deliberation about means which depends on a prior agreement about ends. He does not keep means and ends separate, but defines them interactively as he frames a problematic situation.” (Schön, 1983, p. 68)

Reflection-in-action is limited to what Schön calls the *action present*: “the zone of time in which action can still make a difference to the situation” (Schön, 1983, p. 62). This is not the case in reflection-on-action, which takes place *after* the action itself. Reflection-on-action occurs when, during a routine action, we are confronted with an unexpected result (Schön, 1987, p. 26). This reflection-on-action can change our future actions. According to Schön, reflection-on-action implies inquiry into the personal theories which lie at the basis of one's actions.

To several authors, reflection has an emancipatory or otherwise ethical meaning. Ross (1987) for example, relates reflection to rationality and responsibility:

“Reflection is a way of thinking about educational matters that involves the ability to make rational choices and to assume responsibility for those choices.” (p. 1)

Zeichner's (1983) view of reflection is strongly grounded in the work of Habermas (1973) and further elaboration of this work by Van Manen (1977). It implies the acceptance of a particular ideology, along with its accompanying assumptions and epistemology (Gore, 1987; Hatton & Smith, 1995). Within this ideology, the emphasis is on the degree to which teachers critically reflect on the moral, ethical, political and instrumental values embedded in their

everyday thinking and practice (Zeichner, 1983, 1987; Liston & Zeichner, 1990; Valli, 1990). A completely different approach is described by Cruickshank et al. (1981). Here the object of reflection is the effectiveness of instructional strategies in attaining given ends. This more technical approach is most probably based on a view of the teacher as a competent, highly technical person (see Gore, 1987), although the authors also state that their aim is to develop in students good habits of thinking about teaching, in order to become “wise as teachers”. Pollard and Tann (1995) combine the goal of reflecting on aims and consequences of one’s own actions as a teacher and the goal of enhancing technical efficiency. In their view of reflection, both goals are important reasons for promoting reflection.

Although this brief overview of conceptualizations of reflection is far from exhaustive, it shows that there is no unanimity with regard to a definition of reflection. One important aspect on which conceptualizations of reflection differ, is the question of what educational aspects are important to be reflected on (Calderhead, 1989; Hatton & Smith, 1995; Zeichner, 1983). This question is directly related to the question of what constitutes a good teacher.

In approaches that conceptualize reflection as critical inquiry, advocated by such authors as Zeichner (1983), and also Carr & Kemmis (1986), a good teacher is a critical, inquiring professional. This view is linked to a specific view of the aims of education in schools, i.e. to make students critical, responsible citizens. It will be clear that researchers who emphasize other elements of ‘a good teacher’ will come to other conceptualizations. For example, if one sees a good teacher as someone who helps students to perform well on standardized tests, a completely different operationalization of reflection presents itself. Probably one would then describe reflection in terms of the degree to which the teacher systematically thinks about methods to achieve high test scores. We can conclude that reflection is a highly normative concept.

Empirical research on programs and strategies designed to promote reflection

A major problem with much of the research in this field is that there is a lack of explicitness about philosophies of education underlying the concept of reflection. This makes many claims about effects of promoting reflection questionable or at least unclear. What is needed are coherent theories, in which not only the concept of reflection is clearly defined, but that also describe the relationship between effects of the promotion of reflection and underlying views of good teaching. As long as such theoretical frameworks are missing, prescriptive statements about reflection are questionable, simply because individual views on the goals of education are questionable. Prescriptive statements may be of importance to someone sharing those views, but even this is not always true, since such statements often lack a solid empirical basis.

Not only do authors often fail to present coherent theories, but in this area many claims about program effects are also presented without a careful description of the program itself, which makes it hard to see clear relations between interventions and outcomes. A final problem in researching reflection is that much of what we are attempting to measure takes place in the teacher's head. Although techniques such as stimulated recall (e.g. based on recordings of teaching activities), the analysis of supervisory discourse or logbooks may be helpful, the question always remains whether these methods present us with valid data about what really happened inside the person. In many cases one could wonder whether the research instrument itself was not the main incentive that caused the reflection observed in the respondent.

One conceptualization of reflection that has led to some empirical evidence regarding outcomes of promoting reflection, is the one developed by Zeichner (1983), already mentioned above. Zeichner and Liston (1987) discuss two studies carried out at the University of Wisconsin, which evaluated the effects on student teachers' perspectives towards teaching in a teacher education program based on this conceptualization of reflection. They conclude that the program had little effect on those perspectives, due to socialization into established patterns in

the schools. On the other hand, given the frequently noted shift from an initially humanistic orientation of student teachers to a more custodial one, "it could be argued that both Wisconsin studies indicate that the inquiry-oriented student teaching program stems the onrushing move toward a more custodial view" (Zeichner & Liston, 1987, p. 36).

Zeichner and Liston (1985) assessed the degree to which the reflective orientation characteristic for the Wisconsin program was present in post-observation supervisory conferences. They used a so-called *reflective-teaching-index*, based on the degree to which different types of discourse occur: factual (what occurred in a teaching situation or what will occur), prudential (suggestions or evaluations), justificatory (reasons for choices), and critical (the assessment of the adequacy of justifications for pedagogical activities, and the examination of values and assumptions embedded in the curriculum and instructional activities). They found that almost 20% of the discourse time represented attention to the latter type of communication, and that the conceptual levels of student teachers affected the degree of reflective discourse taking place during the conferences. The authors consider these findings an indication of a partial implementation of the program's goals.

These studies present us with some evidence that the Wisconsin teacher education program was successful in attaining at least some of its goals; in particular, it seemed to help student teachers to view the student-teaching context with a more critical eye, and make them more reflective about their own role as teachers (Zeichner & Liston, 1987, p. 40). On the other hand, Zeichner and Liston also refer to research which showed that the program did not succeed in its goal of promoting student teachers to act collaboratively within small groups on issues of authority and autonomy, and that certain views of teachers as moral craftpersons were not implemented.

During the 1980s, a five-year preparation program was in operation at the University of Florida, based on Ross's notion of reflection, and attempts have been made to investigate the developmental processes of preservice teachers in this program (e.g. Weade & Ernst, 1989), as

well as the effects of program elements on these students (e.g. Krogh & Crews, 1989). The results emphasize such factors as the role played by student teachers' and teacher educators' beliefs and philosophies of education, which have their roots in the personal history of the individual, the influence of the school context, in particular the degree of support forthcoming from the schools with regard to the goal of promoting reflection (Kilgore, Zbikowski, & Ross, 1989), the need for structure in logbook writing (Krogh & Crews, 1989), and the danger that a high degree of reflectivity can lead to self-criticism and a low sense of efficacy (Ashton, Comas, & Ross, 1989).

An operationalization of reflection concurring with the approaches of Zeichner and Van Manen, and useful for the analysis of written texts, has been described by Hatton and Smith (1995). They analyzed the reflective writings of student teachers and distinguish between (1) *descriptive writing*, which is not reflective as it involves no attempt to provide reasons or justifications for events or actions; (2) *descriptive reflection*, which shows attempts to provide such reasons or justifications, but still in a narrative or descriptive way; (3) *dialogic reflection*, demonstrating 'a stepping back' from the events or actions, leading to a different level of mulling about, discourse with self and exploration of the experience, events, and actions, using qualities of judgments and possible alternatives for explaining and hypothesizing; (4) *critical reflection*, demonstrating an awareness that actions and events are not only located in, and explicable by, reference to multiple perspectives, but are located in, and influenced by multiple historical, and socio-political contexts. Hatton and Smith showed that in a four-year teacher education program at the University of Sydney, the student teachers clearly showed evidence of descriptive reflection in their final year, and instances of dialogic and critical reflection were also found. Hatton and Smith noted that dialogic reflection was highly promoted through 'critical friends' interviews.

Although these are a few examples of empirical studies that did provide evidence of program effects, it is important to note that many attempts to operationalize reflection or establish outcomes of promoting reflection have failed, as many researchers in this field have observed (e.g. Author et al, 2001, p. 57). Indeed:

“the terms are extremely difficult to render operational in questionnaires and other research instruments. Then it would appear that it has been a considerable challenge to develop means for gathering data and analysing data so that the evidence shows unequivocally that reflection has taken place” (Hatton & Smith, 1995, p. 38-39).

One of the major problems is that it is impossible to determine on the basis of essays written about an experience whether or not reflection-in-action or reflection-on-action has taken place during or after the experience, as these essays “provide only indirect evidence of either kind of reflection, and no way of distinguishing what is being thought about *now* in contrast to *then*” (Hatton & Smith, 1995, p. 42).

In the next sections we will describe our own research into a Dutch program for the preparation of reflective secondary school mathematics teachers. We will do so in a manner that takes the outcomes of the above analysis into account.

A Dutch teacher education program aiming at the promotion of reflection

The program that we studied was in operation during the 1970s and 1980s, at a teacher education college in Utrecht, the Netherlands. At the time of the research studies, it was a 4½-year program with cohort groups, in which student teachers selected a second subject, in addition to mathematics. An aggregate of one year, distributed over the 4½-year period, was devoted to the professional preparation, which was strongly integrated with the subject matter component of the program.

In line with our above analysis, we will firstly describe the view of good teaching underlying

this program, the definition of reflection the program was based on, and the program itself. In the next sections, we will focus on the design and results of four research studies into this program.

The underlying view of good teaching and reflection

We analyzed the views of the staff of the mathematics teacher education program (during the period in question consisting of 10 to 13 teacher educators), using document analysis (there were a great many formal and informal papers available, written by staff members), and interviews with a few staff members. A verification of this analysis was carried out by means of a study among 139 graduates and students, who, in questionnaires and interviews, were asked to give the characteristics of their preparation program. Moreover, the views of the staff were translated into a questionnaire consisting of 46 statements, which were scored by all the teacher educators on a five-point scale.

The views of the program staff appeared to be strongly influenced by the context of Dutch secondary school mathematics education, which in the 1970s saw a surge in the direction of realistic mathematics education (Freudenthal, 1991; Treffers, 1987). This entails the use of concrete problems and real-world contexts. Students were taught to translate a problem from reality into a mathematical model, to apply mathematical techniques within that model, and then to translate the mathematical solution into the best possible solution in the real world. Students were thus required to analyze, to distinguish between matters of major and minor importance, to structure, to combine theory and practice, and to devise creative alternative solutions and methods of problem-solving. Within this context, collaborative learning and metacognitive strategies received explicit consideration. This process-oriented view of mathematics education influenced the thinking of the teacher educators in the program under study. The promotion of the ability to analyze, to structure and to devise creative solutions were among the basic

educational goals, both for students in mathematics classrooms, and for the student teachers. As regards the latter group, these goals were pursued not only in the mathematics component, but also in the professional preparation component of the program. The aim was to produce student teachers ultimately capable of independently structuring their professional experiences, by using the ALACT model of reflection, named after the first letters of the five phases (see Figure 1; for a more detailed description, see Author et al, 2001).

[insert Figure 1]

This model, which is an adaptation of the well known model developed by Kolb and Fry (1975), has later been used in many other teacher education programs throughout the world (see for example Brandenburg 2008, Hoel & Gudmundsdottir 1999, and Jones, 2008). The process described by this model implies a specific conception of reflection, as the crux of this process lies in phase 3 of the model, where a mental structure is formed, or an existing mental structure altered. This concurs with the following definition of reflection: *Reflection is the mental process of structuring or restructuring an experience, a problem or existing knowledge or insights.*

Program description

In the view of the program staff, reflective teachers are capable of tracing the ALACT cycle for all aspects of the teaching and learning situation, for example mathematical situations, interpersonal relationships in the classroom, and their own development as a teacher. *Learning how to reflect* using the ALACT model, was an important program goal, which aimed at the development of the capacity to self-direct one's own professional growth. The student teachers learned how to reflect *before* embarking on student teaching. The first period of student teaching can be one of extreme stress, in which the prime concern is simply to 'get through'.

Hence it is not an auspicious moment for learning how to reflect. An important assumption was that prospective teachers must already have at their disposal sufficient powers of reflection to enable them to evaluate the influence of such personal concerns on the way they themselves function in the classroom (cf. Goodman, 1985). This means that in the first year of the program, other experiences were used for reflection. First of all, there was a special practicum, in which the student teachers learned to reflect on their own thoughts, feelings, attitudes and actions in everyday relationships with their fellow students. This practicum also contained exercises aiming at the promotion of social skills, such as empathy, expressing feelings, etcetera.

The processes involved in learning the mathematical content in the program were also used as objects of reflection. The student teachers were encouraged to reflect both on the subject content and on the way they helped or cooperated with their fellow students. At regular intervals, the students were asked to hand in written reports on the way they worked on a particular mathematical problem. In this way, not only the mathematical product was stressed, but also the mathematical inquiry process.

Throughout the program there were several points at which the student teachers were allowed a choice. They had a say in the general curriculum, and in the mathematics courses they were often given a choice of materials. There is a close link between learning to reflect and learning to choose: pondering past or future choices compels the prospective teachers to reflect on their own goals and attitudes. Individual interviews and the students' logbooks, to which the supervisors added their comments, encouraged the student teachers to reflect on the various choices open to them, and helped them to develop their own style of teaching.

It was not until the second year that student teachers actually became involved in practical teaching. The first stage was helping individual secondary school students (a one-to-one arrangement). This eliminated the problem of controlling a whole class and gave the student teachers enough safety to devote their full attention to individual learning processes and

pedagogy. Here, too, the use of the logbook and college-based supervision were important in stimulating reflection.

The first classroom experience took place at the end of the second year. A primary school class (11 to 12-year-olds) was divided into three (or two) groups. During a period of six weeks each student teacher worked with his or her own group of about eight children for one to one-and-a-half hours a week, while the cooperating teacher was not present. The group of two or three student teachers teaching children from the same class was supervised by a teacher educator. This supervision was based on the students' logbooks and the supervisor did not visit the school, which means that the student teachers were given a large measure of freedom and responsibility. This helped the prospective teachers to find their own personal style of teaching and, more important, it stimulates reflection on personal style and growth. In the third and fourth years, the student teachers worked with whole classes at secondary school level and were supervised by cooperating teachers. To provide effective supervision these teachers were trained for this role, with a focus on promoting reflection with the aid of the ALACT model.

Study 1: An overall program evaluation

An initial overall evaluation of the program consisted of a written survey among 116 graduates and 13 student teachers on the point of graduating, supplemented by interviews with 10 of them.

The most important questions in the questionnaire were:

1. What have you learned during your teacher education period?
2. What do think was lacking in your teacher education program?

Findings

We will now discuss the most important findings of this study. On the first question, more than half of the respondents *spontaneously* mentioned learning results in the field of reflection and

directing one's own development. In answer to the second question, many teachers, especially those working in lower vocational schools, reported difficulties in controlling the class and in handling motivation problems.

Another important research finding was that the respondents differed in their appreciation of a reflective way of learning. On the basis of the data, we could distinguish between *internally and externally oriented* student teachers. The former are students wanting to use their own knowledge and values to structure problems and experiences *themselves*. Externally oriented student teachers feel a strong need for guidelines and structuring from outside (from the teacher educators, for example).

Study 2: The IEO test

After distinguishing between internally and externally oriented student teachers, we devised a questionnaire to measure these learning orientations, called the IEO test for Internal/External Orientation (Author, 1993). There are two versions of this test: one designed for student teachers in the initial stage of the preparation program, and the other intended for teachers or student teachers with experience in classroom teaching.

Version 1 consists of six subscales, concerned with internal (I) and external (E) learning orientations in the following domains: (S) the prospective teacher himself or herself, (F) the fellow students, and (M) the subject matter in the program (mathematics). (Table 1.) A pilot study had revealed that the learning orientations of student teachers differ in these domains (Author, 1988). Each scale is composed of two types of items. Type a asks the students to indicate to what extent a statement is correct, type b items ask how often the student does something. Both types of items are scored on a five-point scale, with a score of 5 meaning totally applicable (for type a) or always (for type b items).

[insert Table 1 here]

Version 2 of the IEO test (for teachers or student teachers with teaching experience) consists of eight subscales, namely two scales (for the degree of internal orientation and the degree of external orientation) for each of the following domains: (S) the teacher himself or herself, (P) the students in the school, (M) the subject matter at school (mathematics), and (C) the school context.

Version 1 of the test was administered to first- and second-year mathematics students in the program and in two other colleges of teacher education in the Netherlands ($n = 138$). From Table 2 we can conclude that the test is a reliable instrument.

[insert Table 2 here]

We used the IEO test to determine whether the mathematics students did indeed acquire a more pronounced internal learning orientation during the Utrecht program. By means of a t-test we compared the SI, FI and MI scores of the 37 students majoring in mathematics with those of 55 students of the other two colleges likewise majoring in mathematics. The choice of mathematics majors is important here, since it was only the majors who were taught according to the principle of promoting reflection. In the mathematics department of the two other colleges this was not an explicit goal.

Findings

The Utrecht students did not score significantly higher on the three internal scales than the students of the other teacher colleges. It is important to note that the group studied consisted of first and second-year students. Any results of the promotion of reflection may be expected to be

realized gradually. It was for this reason that we also compared the scores of first and second-year Utrecht students on the internal scales. No significant differences were recorded on the FI and MI scales, but on the SI scale (reflection on oneself), second-year students scored significantly higher than first-year students ($p = .02$, on a one-tailed t-test). However, second-year students of the other colleges also scored significantly higher on SI than first-year students, although the difference was somewhat less marked (Table 3).

[insert Table 3 here]

We also used this study to determine how the extent to which student teachers are internally or externally oriented in the domains 'self', 'fellow students' and 'mathematics' correlates with the variables age, previous schooling, and gender. Older students appeared to be less inclined to reflect on their relationships with their peers ($r = -.29$, $p = .01$). We found a tendency of student teachers with a relatively high level of previous schooling to be less externally oriented with regard to the teaching of mathematics ($p = .02$). It was noteworthy that there proved to be almost no relationship between age and an internal learning orientation with regard to oneself ($r = -.03$).

Study 3: A longitudinal study

The phenomenon of internally and externally oriented student teachers also led to a third study, with a longitudinal design, focusing on the following research questions:

1. How do students with different learning orientations develop during the program?
2. What is the impact of the program on the development of students with different learning orientations?

We followed a group of 18 students during the program, and into their first two years of teaching, using the following instruments:

a. *Teacher educator questionnaires and interviews*. Each year, the teacher educators were asked to fill out questionnaires about the student teachers, and they were interviewed to gather more background information about the students and the educators' ideas about the students' development.

b. *Kelly's repertory grid* (Kelly, 1955), which revealed the mental constructs used by the teacher educators in evaluating their students.

c. *Interviews* with the students, twice each year, about their opinions of the program, learning results, points of criticism, the characteristics of the program as seen by the students, and their attitudes towards reflection as a means for professional learning.

d. *The IEO test*.

(For more details of this study, see Author, 1988.)

Findings

This study again brought to light a difference between internally and externally oriented student teachers. To illustrate this difference, we will give some examples of statements by respondents.

The respondents with an internal learning orientation made statements such as:

I have learned to reflect on my teaching. I think this is important because I think it can be helpful when I am teaching on my own. How can I correct myself? What did I do well? What did I do wrong? Why? I think that the ability to do this can be important in difficult classroom situations.

I have learned to learn, as best I can, from my experiences.

I have learned to look at my mistakes and to improve myself.

I have discovered that it helps, and that it is necessary to keep asking myself why I do things in a certain way.

I have learned to evaluate myself.

I think the most important thing I've learned is to look at myself, to solve problems by myself, or at least to work out the first steps towards solving a problem.

I have learned to act self-reflectively, to regularly look back on the way I function as a teacher, and to attach to these actions both conclusions and guidelines for the future.

Externally oriented respondents made the following statements on the program:

There are too many things you have to find out for yourself.

It should be clearer what you are supposed to learn, when something is good enough, what is right and what is wrong.

Those teacher educators are always asking questions.

You have to keep telling them what your opinion is, and what you are thinking or feeling.

Too much has to come from the group, and there is not enough explanation.

There is no structure.

I would rather have had a course with the ordinary things you come across every day, like refusing to work, cribbing, and cutting classes.

How do you deal with situations that have to do with a lack of motivation on the part of the students?

The study revealed that in some cases there was a ‘clash’ between the implicit conceptions of learning on the part of the teacher educators (strongly based on the notion of reflection) and the learning orientations of the student teachers. One danger in a teacher education program based on the goal of promoting reflection is that it is most beneficial to those who are already fairly reflective (cf. Calderhead 1989, and LaBoskey, 1993).

The longitudinal study showed that after one and a half years, most of the externally oriented student teachers in the research group of eighteen had left the program. Although this was often due to poor results in mathematics, the fact that the structure they desired was lacking, appeared to be a major motive for the decision to drop out. Of the eighteen student teachers in the group, eight gave up their studies before the end of the second year. The analysis of the data seemed to indicate that some of these students would have benefited from an even more gradual introduction to the reflective approach than the teacher education staff already used.

Study 4: A comparison of the outcomes of two teacher education programs

Finally, a fourth study was carried out in which graduates of the Utrecht program were

compared with a control group of graduates of another, more subject-matter oriented program (Author et al, 1990). The graduates of the Utrecht program (n = 37) and the other program (n = 36) had been teaching between one and ten years.

In order to test the accuracy of the assumption that the two programs did differ, the graduates were asked to describe the most important characteristics of their program. The written answers were analyzed by an independent researcher, who examined for each characteristic whether it had to do with the issue of reflection. Of the graduates in the control group only 6% mentioned an item related to reflection, as opposed to 47% in the control group. The item mentioned most by members of the control group (33%) was the importance of a good understanding of mathematics, a principle not mentioned by any of the teachers from the Utrecht program. These results confirmed our hypotheses about the characteristics of the two programs.

Next, the graduates were compared with regard to the following variables: (1) reflective attitude; (2) inclination towards innovation; (3) job satisfaction; (4) the quality of the interpersonal relationships with the students in their classes (as observed by their students); (5) the adequacy of the teachers' perceptions of these relationships.

Variable 1 was measured with the IEO test (the internal scales of the second version); the variables 2 and 3 with slight adaptations of questionnaires previously used by Dann et al. (1978) and Prick (1985), with 7 and 9 items respectively. The variables 4 and 5 were measured with the QTI (Wubbels et al., 1985), a questionnaire with 80 items, measuring student perceptions of teacher behavior. The QTI is based on a model devised by Leary (1957) for the analysis of interpersonal relationships, with two dimensions, influence (dominance – submission) and proximity (cooperation – opposition). The QTI has been used extensively for research purposes and has proved consistently reliable (e.g. Wubbels et al., 1987).

Variable 5 is measured by determining the difference between the students' and the teacher's perceptions of the teacher's behavior.

Findings

This study demonstrated no clear evidence of effects of the program on teachers' reflective attitude and inclination towards innovation. This result is of course somewhat disappointing, given the close relationship between these variables and the program goals. On the other hand, a noteworthy result was that graduates of this program performed better on the variables quality of interpersonal relationships, adequacy of their perception of these relationships, and job satisfaction than the control group, and that these effects were significant for those teachers who graduated more than two years before (Author et al, 1990). This seems to support the idea that the effect of a program designed to promote reflection mainly surface in the long run, a phenomenon also found by Zeichner (1987, p. 573), and Author et al (2005).

6. Conclusions and discussion

We may draw a number of conclusions. First, the different conceptualizations of reflection and reflective teaching that researchers use, are generally too vague to be used as the starting point for curriculum development in teacher education. Much clarification and elaboration of the concept of reflection in relation to underlying philosophies of education are needed. This will help us to move beyond vague discussions and beliefs about the benefits of teacher education programs designed to promote reflection, and instead, to build our theories on empirical data concerning program outcomes. This requires not only careful operationalization of the concepts of reflection and reflective teaching, but also more rigorous research methods. This is no simple task, considering the fact that much of what we are attempting to influence, takes place in the teacher's head.

We discussed a few studies devoted to the effects of programs and strategies designed to promote reflection that have produced some evidence of favorable influences on certain aspects

of teachers' functioning. However, they also seem to indicate that contextual influences on teacher education have a limiting effect on the potential of those programs (cf. Author et al, 2005). We believe that contextual influences on teacher development should be an important issue in the research on reflective teaching. It may be necessary to investigate effects of altering the context of student teaching. This requires a specific type of research, for example action research or self-study research, carried out by teams of teacher educators, in collaboration with teachers and researchers.

The relationship between the promotion of reflection and the quality of teaching has hardly been studied in depth by researchers, or at least not with the aid of strong research methodologies. In our view, effect studies should focus on the question of which program characteristics and program elements are responsible for which effects on teaching, and thus on the important practical question of which strategies employed in the preparation of more reflective teachers appear most promising. In order to assess relationships between program characteristics and learning outcomes, we also need longitudinal studies focusing on the developmental processes of teachers, both during their preparation and after (cf. Zeichner, 1987).

Important in our own research studies on the promotion of reflection is that we found effects on the quality of teachers' interpersonal relationships in the classroom, on the adequacy of their perception of these relationships, and on job satisfaction. We also found strong indications that program effects may take a while to manifest themselves. This was a main result of study 4.

In this context it is interesting to note that in study 1 we saw that even teachers who acquired a strong inclination towards reflection during the program, did not benefit much from this attitude during the initial period of their teaching careers. An illustration is given by a graduate who, one year after graduation, not only stressed his learning results in the field of reflection, but also said:

"I had the experience that the capacity for reflection was pushed away when you meet a cumulation of conflicts. You feel empty. I no longer had any point of reference. And this happened although everything went very well during teacher preparation and during field-based experiences... But the ability to face problems returns. I am growing again. I just stood still for a while."

This example is similar to other stories reported by the graduates. After one or two years, lost ideals got a new chance as well, as many of the respondents reported. The results of study 3 were in line with this finding: when the teachers in this longitudinal study were in their first year of teaching, they showed a decrease in reflection about the relationships between their ideals and their everyday teaching practice, but at the same time they were very aware of this phenomenon. These graduates of the Utrecht program seemed to use a strategy of both temporary adjustment to established patterns of school practice and waiting for the moment they saw a chance to realize their 'latent' ideals. On the basis of our findings we suggest that the ability to reflect tends to pass through a so-called *latency period*, which generally lasts between half a year and two years.

Another important conclusion from our own research is that a more gradual approach to reflection may benefit more externally oriented students. It may be advisable in the initial stages to offer these students the external structure they prefer. We refer to this as *a strategy of gradualness* (also advocated by Hatton & Smith, 1995). Otherwise, the externally oriented students' feelings that they do not really benefit from their studies can become a self-fulfilling prophecy. The teacher educator can help externally oriented student teachers by not expecting them to be able to figure out everything for themselves right from the start, and by giving them concrete instructions, offering them choices and providing sufficient feedback. The use of logbooks provides opportunities to give student teachers individual feedback on their learning process, and this may be especially helpful for externally oriented student teachers. "Make haste slowly" is the watchword here, for

"An emphasis upon reflection too soon in their preparation may be alienating to neophytes. It can become

difficult to sustain, for student teachers may see it as a rather esoteric and useless diversion from mastering the technical skills and content of teaching which they regard as essential, especially early in their training.”

(Hatton & Smith, 1995, p. 36)

We have the experience that having student teachers reflect on short lessons to their fellow students (lessons of about ten minutes), at least in the beginning of a program, seems more effective for the promotion of reflection than asking them to analyze longer lessons or lessons given to students at school and focusing on issues that are not their first concern.

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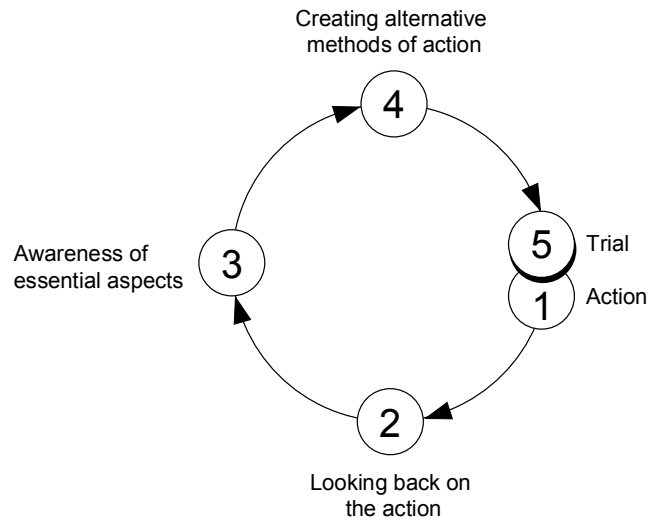


Figure 1: The ALACT model.

Table 1: Three representative items from each scale of the IEO Test (Version 1, items translated from Dutch).

<i>No.</i>	<i>Item</i>	<i>Scale</i>	<i>Type</i>	<i>M</i>	<i>SD</i>
47	I ask myself "Who am I?"	SI	b	3.23	1.26
57	I think about my own development.	SI	b	3.33	1.15
60	I reflect on myself.	SI	b	3.60	1.10
18	I appreciate it when people tell me how I can improve my conduct.	SE	a	3.81	0.88
31	I want people to tell me what I am doing wrong.	SE	a	3.75	0.95
40	I like it when others comment on my behavior.	SE	a	3.55	0.89
25	I am interested in my fellow students.	FI	a	3.64	0.89
42	I try to get to know my fellow students.	FI	a	3.53	0.90
54	I am interested in the problems of my fellow students.	FI	b	2.72	0.98
33	I am interested in tips on the best way of working with my fellow students.	FE	a	3.23	0.95
35	I consider it important to receive information from a supervisor about my way of dealing with my fellow students.	FE	a	2.92	1.09
43	I think it is important to be given suggestions for better ways of co-operating with my fellow students.	FE	a	3.17	1.00
30	I can spend hours working out a mathematical problem.	MI	a	3.29	1.42
51	I try to solve mathematical puzzles in my spare time.	MI	b	2.53	1.12
53	I sometimes go on thinking about mathematical problems that have come up.	MI	b	3.12	0.97
4	I like to have the support of others when I am working on mathematical problems.	ME	a	3.65	1.02
26	I like to work on mathematical textbooks in which everything is explained step by step.	ME	a	3.64	1.16
32	I like it when someone shows me how to solve a certain type of math problem.	ME	a	3.56	1.00

Table 2: Reliabilities of the IEO Scales ($n = 138$).

	Scales					
	SI	SE	FI	FE	MI	ME
Number of items	11	10	10	10	10	10
Cronbach's alpha	.87	.77	.87	.81	.85	.80

Table 3: Scores on the SI scale of first- and second-year student teachers majoring in mathematics.

		First Year		Second Year		t	p (1-tailed)
		n	M	n	M		
All students	Utrecht program	26	3.32	11	3.82	2.04	.02
	other colleges	18	3.20	37	3.56	1.74	.04
Men	Utrecht program	13	3.32	8	3.80	1.47	.08
	other colleges	12	3.18	23	3.46	1.00	.16
Women	Utrecht program	12	3.30	3	3.85	1.31	.11
	other colleges	5	3.44	14	3.73	0.98	.17

Note: A number of subtotals do not tally, due to missing data.