An Exploratory Study of the Level of Reflection Attained by Preservice Teachers

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Abstract

This exploratory study investigated the levels of reflection achieved over three quarters by graduate level preservice teachers. Levels of reflection were determined through analysis of their reflective journal entries on readings and field experiences. A repeated measures two factor ANOVA completely within design was used to systematically analyze changes in the level of reflection. Even without specific training in reflection and reflective thinking, some significant growth occurred in the levels of reflection as a result of asking preservice teachers simply to reflect. However, only one participant achieved the highest level of reflection.

Efforts to study and develop reflection or reflective thinking skills have been complicated by variations in the definition and use of those terms. Early in this century, Dewey (1904) introduced educators to the concept of reflection by describing it as thinking about and reflecting upon one's teaching experience. He later expanded this definition, referring to reflective thinking as "behavior which involves active, persistent, and careful consideration of any belief or supposed form of knowledge in light of the grounds that support it and further conclusions to which it tends" (Dewey, 1933, p. 9).

According to Van Manen (1991), reflection refers to the process by which teachers engage in aspects of critical thinking such as careful deliberation and analysis, making choices, and reaching decisions about a course of action related to teaching. Ross (1989) views reflection as "a way of thinking about educational matters that involves the ability to make rational choices and to assume responsibility for those choices" (p. 22). Shulman (1987) defines it as "a process that involves reviewing, reconstructing, reenacting, and critically analyzing one's own and the class' performance" (p. 15).

Reflection is currently viewed as an essential component of preservice teacher education programs because it is seen as the primary means by which preservice teachers become thoughtful about their experiences (Pultorak, 1993). Being reflective allows them to refine and improve their teaching. By applying critical thinking skills such as problem-solving, decision-making, and analysis from multiple perspectives to their experiences, preservice teachers can become more knowledgeable about themselves and their performance as professionals. Thus, reflection is the means by which preservice teachers may become reflective practitioners. Reflective practitioners are viewed as those who link theory to practice, balance learning and teaching styles with content, question and analyze their own practice from multiple perspectives, make decisions grounded in knowledge, and evaluate alternatives for future applications (Irwin, 1987; Reagan, 1993; Roth,

1989; Rust, 1988; Schön, 1987; Sparks-Langer, Simmons, Pasch, Colton, & Starko, 1990).

Reflective Abilities

Several researchers consider reflective abilities to be critical to the development of preservice teachers (Korthagen & Verkuyl, 1987; Richards, Gipe, Levitov, & Speaker, 1989; Ross, 1989; Roth, 1989; Rovegno, 1992; Tsangaridou & O'Sullivan, 1994). However, there is, as yet, no consensus in the field on its definition. Reflective abilities seem to represent the combination of reflective attitudes and cognitive processes that enable reflection to occur. It appears that when an action, experience, or idea stimulates an individual to become thoughtful about or to reflect upon that experience, both reflective attitudes and cognitive processes come into play.

Reflective attitudes, which Boud, Keogh, and Walker (1985) believe are an essential component of reflection, are directly related to the affective domain. Open-mindedness, responsibility for actions and/or decisions, and wholeheartedness are the three reflective attitudes that Dewey (1933) initially identified and that other researchers have more recently addressed (Cruickshank, 1987; Goodman, 1984; Ross, 1989; Ross & Hannay, 1986; Zeichner & Teitelbaum, 1982).

The following cognitive processes seem to be involved in reflection: (1) identifying dilemmas, situations or problems (Boyd & Fales, 1983; Ross, 1989; Rovegno, 1992); (2) describing and analyzing situations (Boud et al., 1985; Boyd & Fales, 1983; Cruickshank, 1986a; Goodman, 1984; Ross, 1989; Roth, 1989; Shapiro, 1985; Sparks-Langer & Colton, 1991; Zeichner & Liston, 1987); (3) evaluating information to clarify the situation (Boyd & Fales, 1983; Goodman, 1984; Kolb and Fry, 1975; Roth, 1989); (4) re-examining experiences from multiple perspectives (Boyd & Fales, 1983; Boud et al., 1985, Ross, 1989; Roth, 1989; Rovegno, 1992; Schoen,

1983); (5) associating new knowledge with previous knowledge, integrating new knowledge into existing schemata, and appropriating new knowledge (Boud et al.,1985; Rovegno, 1992); (6) synthesizing conflicting evidence (Rovegno, 1992); (7) relating teacher's actions to student learning (Rovegno, 1992); (8) imagining new alternatives (Rovegno, 1992); (9) providing alternative explanations of a classroom event (Ross, 1989); (10) articulating arguments based on evidence (Ross, 1989); (11) solving problems, and/or making decisions (Boud et al., 1985; Boyd & Fales, 1983; Cruickshank, 1986b, Dewey, 1933; Kolb & Fry, 1975; Parsons, 1983; Roth, 1989; Rovegno, 1992; Zeichner & Liston, 1987); (12) making inferences and developing and testing hypotheses (Boud et al., 1985; Boyd & Fales, 1983; Cruickshank, 1986b; Kolb & Fry, 1975; Roth, 1989; Schoen, 1983; Sparks-Langer & Colton, 1991); and (13) understanding the ethical and moral consequences of teaching (Goodman, 1984; Zeichner & Liston, 1987).

Developing Reflective Practitioners

In order to become reflective practitioners, preservice teachers need to develop and use reflective abilities. As Kuhn (1986) has pointed out, "the only way to improve teachers' thinking is to involve them in it" (p. 502). Dewey (1904) emphasized that people should be taught how to think by being involved in thinking, and that it could be even more important to prepare preservice teachers to think about their work than to teach them teaching strategies.

Reflective abilities are developed by "involving student teachers in critical, reflective thinking about their work" (Bolin, 1988, p. 48) and in a variety of reflective exercises (Kuhn, 1986). Dewey (1933) found that student teachers tend to be more reflective if the experiences upon which they are expected to reflect are real. Building on this idea, Roth (1989) suggests that in order to develop reflective capabilities preservice teachers need to have opportunities to reflect on their observations during field experiences and in real school settings. According to Bolin (1988), this enables students to analyze and interpret field experiences and classroom observations with a different attitude. In addition, students also discover assumptions and arrive at implications for classroom practice (Liston & Zeichner, 1987).

For Sparks-Langer et al. (1990), asking the *why* question is essential for the development of reflective thinking in preservice teachers. If students do not understand why something worked or did not work, they will have difficulty figuring out what to do next. Along these same lines, helping preservice teachers describe what happened, why it happened (its rationale), and how it could be improved encourages them to reflect (Cruickshank & Applegate, 1981; Roth, 1989; Van Manen, 1991; Smyth, 1989).

Preservice teachers differ in their willingness and abilities to reflect about teaching (Korthagen & Verkuyl, 1987; Richards et al., 1989; Ross, 1989). The ability to reflect also varies depending on the topic (Ross, 1989). In her study, Ross (1989) reported that the students achieved higher levels of reflection when they were able to apply research findings and critiques of teacher effectiveness research while acknowledging the strengths and limitations of it.

Richards et al. (1989) reported that some preservice teachers possess a natural ability to examine and critically question themselves. Other studies suggest that preservice teachers can value the role of reflection and therefore are able to improve the quality and amount of reflection (MacKinnon, 1987; Nolan & Huber, 1982; Richards & Gipe, 1988; Richert, 1988; Sebran, 1989; Wildman & Niles, 1987). As a consequence, preservice teachers can be helped to develop or improve their reflective abilities (Ross, 1990; Teitelbaum & Britzman, 1991; Wubbels & Korthagen, 1990). Reflective practice thus may be the means of developing analytical abilities as well (Ross, 1989; Tsangaridou & O'Sullivan, 1994).

In contrast, other studies found that some preservice teachers appear unwilling to reflect and are resistant to reflective experiences (Calderhead, 1992; Richards et al., 1989; Sebran, 1989; Zeichner & Liston, 1987). Zeichner and Liston (1987) believe that this resistance is due to the fact that some preservice teachers do not value reflection. Richards et al. (1989) reported that some preservice teachers are unable to reflect about their work because they see reflective assignments as meaningless and because they lack personal and psychological characteristics related to reflective abilities. These students also seem to confuse reflection with simple descriptions of classroom events.

There appear to be three factors related to the development of reflection in preservice teachers. These are: availability of time to reflect on a daily basis, time to actually develop reflective abilities, and a supportive and nonthreatening environment in which reflection occurs (Nolan & Huber, 1989; Richert, 1988; Sebran, 1989; Weade, 1987; Wildman & Niles, 1987). Reflective abilities may also be encouraged by implementing an indirect supervisory style during student teaching (Tsangaridou & O'Sullivan, 1994). Training supervisors in the use of an inquiry and reflective approach is as vital as having cooperating teachers encourage student teachers to question classroom practice. It is also important for student teachers to be exposed to, and trained within, this inquiry and reflective approach if they are to become more reflective (Zeichner & Liston, 1987). Troyer's study (1988) not only supports the need for training but also suggests that training in reflection should be introduced very early in the professional education component of teacher education programs.

A Model of the Reflective Process

Boud et al. (1985) aligned their "Model of Reflection in the Learning Process" (p. 20) with Dewey's (1933) description of a reflective activity process. They built upon Dewey's concept of reflecting on experience. This model has three broad components: (a) experiences, which are the antecedent stimuli for reflection; (b) reflective processes; and (c) outcomes, which include the consequences of be-

havior and new actions taken. The experiences component includes such things as behaviors, ideas, and feelings. The reflective processes component has three stages: (1) returning to experience, (2) attending to feelings, and (3) re-evaluating experience.

The first stage in the reflective processes component, *returning to experience*, involves remembering, reviewing, and reconstructing one's experience. This experience is described in detail, in written form, without judging. The preservice teacher is expected to view the experience from different perspectives. According to Boyd and Fales (1983), during this stage the student needs to be open to new information (which Dewey (1933) called "open-mindedness") from internal and external sources in order to process the event from multiple perspectives. This is when intervention and training can occur.

The second stage of the reflective processes component, *attending to feelings*, is seen by Boud et al. (1985) as essential to the reflective process. Feelings are viewed as promoting affective and cognitive learning. Positive feelings enhance learning, while negative feelings are obstacles to learning and hinder reflection. Therefore, negative feelings need to be removed or transformed for learning to take place. Writing can be a powerful means to discharge negative feelings (Rainer, 1980).

The third stage of the reflective processes component, *re-evaluating experience*, is vital because it includes association, integration, appropriation, and validation which determine whether the experience will become meaningful to the individual. At this stage, resolution occurs as the individual arrives at an adequate solution or a change in perspective (Boyd & Fales, 1983).

The outcomes component constitutes the end of the reflective process and prepares one for a new experience. Therefore, the outcome,

> ... may include a new way of doing something, the clarification of an issue, the development of a skill or the resolution of a problem. A new cognitive map may emerge, or a new set of ideas may be identified. The changes may be quite small or they may be large. They could involve the development of new perspectives on experience or changes in behavior (Boud et al., 1985, p. 34).

Assessing Reflection

The varied definitions of reflection have led researchers to develop a variety of assessment tools for determining to what extent, or at what level, reflection is occurring. For the purposes of this study, two frameworks were used to assess the levels of reflection attained by preservice teachers in, respectively, reading journals and field journals.

Ross' (1989) framework, Criteria for Assessing Levels of Reflection, was designed specifically to assess levels of reflection on theory-to-practice papers. The framework uses a three-tier leveling process with subcategories within each tier. A summary of Ross' framework is presented in Table 1.

Table 1

A Summary of Ross' Criteria for Assessing Levels of Reflection

Level 1: Low

1.1 give examples of teacher implementing or not implementing a finding from research;

1.2 describe a teacher's practice as being only partially consistent with research;

1.3 agree with a position taken in an article by restating the author's arguments.

Level 2: Moderate

2.1 provide a good critique of practice from one perspective;

2.2 analyze in detail a teaching practice;

2.3 recognize that instruction must vary based on aims and student characteristics;

Level 3: High

3.1 view things from multiple perspectives;

3.2 recognize that teacher actions have impact beyond instruction.

Using this framework, Ross (1989) found that students' levels of reflection on the different papers ranged from low to high (low: 44%, moderate: 34.4%, and high: 21.6%). She explained that this variability was mainly due to the topic about which the students were reflecting. Although she acknowledged that students' abilities to reflect may change over time, her data did not show that levels of reflection changed during a semester-long course.

Although Ross (1989) reported that most (78.4%) of the papers were identified at Levels 1 (low) and 2 (moderate), she also noted that almost all students demonstrated a high level of reflection in some of their papers. Although only 22% of the papers were rated at the highest level of reflection, Ross suggested that undergraduate preservice teachers can achieve the highest level of reflection if they are able to view things from multiple perspectives, recognize the importance of making decisions based on multiple factors, and are made aware of the impact of context on teaching. She concluded that "the ability to reflect about practice does not develop in one course" (p. 30). She did point out that a single course could introduce preservice teachers to reflective thinking and help them develop their reflective abilities.

Galvez (1995) proposed a framework for analyzing how preservice teachers progress in reflection. A refined version of that framework which focuses on real school classroom settings was used for this study (see Table 2). Galvez' framework is an adaptation of earlier frameworks developed by Ross (1989) and Smith and Pape (1991). This adaptation was necessary because no framework could be identified that would allow assessment of reflection from multiple perspectives on real classroom settings, even though several authors feel that viewing experiences from multiple perspectives is critical in the reflective process (Boud et al., 1985;

Table 2
Galvez' Assessment for Levels of Reflection

Scale	Levels of Reflection
0	No mention of pedagogical concepts or skills.
	Comments based on self and feelings (Smith & Pape, 1990).
1	General explanation of instructional/non-instructional events in terms of personal experiences without analyzing or predicting consequences based on teaching behavior/performance (Smith & Pape, 1990).
2	Plain description of instructional/non-instructional events in a technical way without analyzing teaching performance or the rationale behind it (Ross, 1989; Smith & Pape, 1990).
3	Focuses on only one aspect of teacher behavior and arrives at implication (Ross, 1989).
4	Critiques teaching behavior from one perspective, that is from the students' in terms of its impact on students and learning outcomes (Ross, 1989) as well as how students behavior is addressed.
5	Analyzes in detail teaching behavior from the teachers' perspective during instructional and/or non-instructional time.
	Discriminates between effective and non-effective instruction (Ross, 1989).
	Analyzes how teachers handle misbehavior in a very specific way and arrives to implications about how to deal with similar situations.
6	Acknowledges that instruction is based on objectives and students' characteristics and that a variety of teaching strategies would be used to match the students' different learning styles (Ross, 1989).
	Analyzes students' progress and its implications related to teaching behavior, instruction, and students' characteristics and learning styles.
7	Evaluates instructional/non-instructional events from multiple perspectives.
	"Acknowledges impact of specific situations and contexts of learning" (Smith & Pape, 1990, p. 6).
	Provides recommendations/suggestions for improvement and for further implementation by using if-then-because statements (Smith & Pape, 1990).

Boyd & Fales, 1983; Ross, 1989). Galvez' framework offers ratings on a zero- to seven- point scale, moving from reflections from a singular perspective to reflections from multiple perspectives (teacher, student, parents, community).

This study was structured following Boud et al.'s (1985) Model of Reflective Processes which has three broad components: Experiences, Reflective Processes, and Outcomes. In order to be able to assess the level of reflection, it is first important to know what the students are reflecting about. They must describe something they learned or something they have experienced (Experiences). Second, they must expand on the idea or experience by reconstructing it, relating it to other personal experiences and feelings, and arriving at a conclusion by associating, integrating, appropriating, and validating that experience or idea (Reflective Processes). Third, they must arrive at an adequate solution or change in perspective (Outcomes). Ross' (1989) and Galvez' (1995) frameworks were created to assess the levels of reflection (Reflective Processes) based on an instructional event (Experiences).

The purpose of this exploratory study was to investigate achieved levels of reflection over time by preservice teachers when they were asked simply to reflect on their field experiences and course content. The specific research question was:

What levels of reflection are achieved by preservice teachers on readings and field experiences and how do the levels of reflection vary over time?

Method

This study was designed to explore changes in reflective thinking over a three-quarter period among preservice teachers who were not trained in reflection or reflective thinking. The investigation was accomplished during the middle three quarters (autumn, winter, and spring) of the five-quarter graduate level teacher certification program. During their first and last quarters (summer 1995, summer 1996), the students were involved in introductory and culminating courses respectively. The three quarters included in this study, encompassed all methods courses, field experiences, and student teaching.

Based on the Boud et al. (1985) model, readings and field experiences (Experiences) provided the context for the students' reflections, which were then expressed in their journal writing (Reflective Processes). The participants were free to implement their conclusions or alternative ideas for classroom instruction during field assignments, which included student teaching (Outcomes).

Participants

The participants in this study were 21 preservice teachers in a graduate elementary teacher certification program at one large midwestern university. Four students were males; 16 were females. The participants were at a typical age for university graduate students (range = 22-24 years),

with the exception of four nontraditional students (over age 24). The participants were enrolled during autumn (quarter one) and winter (quarter two) quarters in social studies, science, math, and language arts methods courses. The participants were also involved in one field experience during each of those quarters. Student teaching occurred during spring quarter (quarter three).

Procedures

The participants kept reflective journals as a part of their regular course work. Permission was granted to the authors to use the journal entries for this study; however, the participants were not informed about the specific objectives of the study.

During the first class meeting, in quarter one, the participants were given a 15-minute orientation to the journal writing required for social studies methods. They were told that they would be keeping two types of journals: a reading journal for social studies, and a field journal.

Participants were told that reading journals were to be handed in, weekly, for five weeks. Reading journals would contain responses to selected readings supplemental to the textbook in social studies. The participants were asked to talk about what they had learned from the readings that was most meaningful and valuable to them and to discuss ways in which they would be able to incorporate those learnings into their future teaching.

For the field journals, participants were told that they were to complete three journal entries, per quarter, for quarters one and two. These were to be handed in at the end of each quarter's field experience. During quarter three (student teaching), six journal entries were to be written per week. These would be turned in every other week for eight weeks. The field journals (which included both field experience and student teaching) would contain any instructional or non-instructional event that caught their attention, a description of it, and explanations of how it could be improved (Cruickshank, Kennedy, Williams, Holton, & Fay, 1981; Van Manen, 1991).

Throughout the study, participants had the freedom, through their field journals, to address any event, emphasize any aspect of it, state their feelings, and suggest how its handling could be improved. They were simply asked to state what they learned, and how they would implement that learning in the near future or use it to improve a particular situation.

Data Collection

The data (journal entries) for the readings were collected as planned on a weekly basis for five weeks during class sessions. Field experience journals were collected at the end of each quarter as planned; and the student teaching journals were collected, as planned, every other week for eight weeks. The principal investigator collected the data.

From each participant, five reading journal entries were collected during each quarter for quarters one and two. The instructor wrote simple evaluative comments (e.g., unclear

please expand, good point) on the journal entries and returned them to the participants within one week. Care was taken to avoid prompting or leading students to higher levels of reflection. The instructor returned papers that were sketchy and asked that they be redone or expanded.

Three field experience journal entries were collected during each quarter, for quarters one and two, and 24 journal entries were collected for the student teaching experience, quarter three. Therefore, from each participant a total of 40 journal entries were collected. This included readings and field journals. Each journal entry averaged from one-half to one typed page in length.

The reading and field journal entries were transcribed by two experienced secretaries. Before the transcription took place, in order to ensure confidentiality, the principal investigator coded each journal entry per individual, type of journal and quarter, and the name of each participant was removed. Copies were then made for each rater.

Data Analysis

The data were organized into data sets. Five data sets were created for each participant as follows:(1) the five reading journal entries for quarter one, (2) the five reading journal entries for quarter two, (3) the three field journal entries for quarter one, (4) the three field journal entries for quarter two, and (5) the 24 field journal entries for quarter three. Each participant was thus assigned a total of five ratings. In total, there were 105 data sets in this study.

The unit of analysis was a conceptual unit, referred to by Bainer and Cantrell (1992,1993) as a reflective unit. Each conceptual unit contained a single idea or thought about a particular topic or event. The conceptual units ranged from a single sentence to a paragraph in length, which in some cases represented the entire journal entry. The conceptual units were identified by the principal investigator.

A level of reflection was assigned to each conceptual (reflective) unit. Thus, one or more levels of reflection were assigned to each journal entry. When there were multiple ratings for a single journal entry, those ratings were averaged to achieve a single level of reflection. As explained above, all journal entries of a similar type (readings or field) per quarter, were organized into a single data set. For each data set, a single overall level of reflection was assigned which was derived by calculating the level of reflection most frequently identified on the journal entries within that data set.

Raters and Ratings. Three raters were trained in the use of two frameworks for assessing levels of reflection: Ross (1989) and Galvez (1995). This process involved a two-day training of three hours per day. A standard procedure was used for training the raters on each framework. First, the framework was explained and discussed, focusing especially on the criteria to be used in assigning a level of reflection to a conceptual unit which could be part of a journal entry or a whole journal entry, as described above. Second, the raters worked collaboratively to rate several

conceptual units which were not analyzed as part of this study. Third, the raters assigned average ratings for journal entries as needed. Fourth, the raters assigned an overall rating to the combined journal entries for each data set. Fifth, practice ratings were compared, analyzed and discussed. Sixth, at the end of the final practice session, each rater was given several data sets with journal entries to rate independently. For the final practice session, the inter-rater reliability was .98 using Cronbach's alpha (Bloom, Fischer, & Orme, 1995).

All data sets were rated following a blind rating process. The inter-rater reliability was .95 (Cronbach's alpha). The data sets were organized into the two types of journals: the reading journals with two sets (quarters one and two)and the field journals with three sets (quarters one, two, and three). The journals were then paired with their respective assessment instruments. That is, reading journals were evaluated using Ross' (1989) criteria and field journals were evaluated with Galvez' (1995) framework. The investigator then coded each data set (readings: one and two; field: one, two, and three). To ensure that the raters would not be able to identify quarters, the reading data sets from quarters one and two were combined into one cluster, and the field data sets from quarters one, two and three were combined into another cluster.

Validity. Content validity and face validity for each of the frameworks were established by having three researchers in the field of teacher education examine the instruments; they agreed that each of the instruments measured aspects of teacher reflection. After the data were collected, a representative sample of the participants examined the two frameworks and agreed that the content of the instruments related to the content of their journals. After ratings of the data were completed, member check was used to corroborate results. A representative sample (25%) of the participants were asked to verify that the ratings assigned to their data sets accurately reflected what they wrote.   The one hundred and five data sets were analyzed quantitatively by using a repeated measures two factor ANOVA completely within sub-

jects design on (a) the overall ratings assigned to the reading data sets rated with using Ross' (1989) framework, and (b) the overall ratings assigned to the field data sets rated with Galvez' (1995) framework. The SAS statistical program was used for this analysis.

Results

Levels of reflection achieved by the participants on the readings data sets are displayed in Table 3.

During quarter one, all the ratings were at Ross' (1989) lower level of reflection (Level 1). During quarter two, while many of the ratings remained at the lower level of reflection (Level 1) there was some movement to the moderate level of reflection (Level 2). This movement is corroborated by the means as well.

Table 4 summarizes a repeated measures two factor ANOVA which was conducted to test for completely within subjects effects on selected readings on Ross' (1989) levels of reflection.

This analysis revealed that the interaction between quarter one and quarter two reflections was statistically significant ($F(2, 40) = 7.51$, $p < .05$)). A post-hoc Tuckey test confirmed the statistical significance at an experiment wise error rate of .05. These results indicated that Ross' (1989) level of reflection on the readings achieved in quarter two was significantly higher than the level of reflection achieved in quarter one.

Galvez-Martin's levels of reflection achieved by the participants on the field data sets are displayed in Table 5.

Some movement was observed over the three quarters towards higher levels of reflection. For purposes of clarification, Levels 0, 1, and 2 were considered the lower levels, Levels 3, 4, and 5 were considered the intermediate levels, and Levels 6 and 7 were considered the highest levels of reflection. During quarter one, most of the ratings were found between the lowest (Levels 1 and 2) and intermediate (Level

Table 3

Ross' Levels of Reflection on Readings in Frequencies, Percentages, and Means

Levels	Quarter 1						Quarter 2					
	R1		R2		R3		R1		R2		R3	
	F	%	F	%	F	%	F	%	F	%	F	%
Level 1	19	91	21	100	21	100	17	81	8	38	15	71
Level 2	2	9	0	0	0	0	4	19	13	62	6	29
Level 3	0	0	0	0	0	0	0	0	0	0	0	0
Totals	21	100	21	100	21	100	21	100	21	100	21	100
M	1.37		1.30		1.30		1.41		1.78		1.53	
Overall					1.32						1.57	
SD	0.25		0.00		0.00		0.29		0.43		0.37	
Overall					0.08						0.23	

R1 = Rater 1; R2 = Rater 2; R3 = Rater 3; F = Number of Ratings; % = Percentages

Table 4
A Repeated Measures Two Factor ANOVA Completely Within on Selected Readings

Source	df	SS	S	F	P
Subjects	21	1.43			
Quarter One Reflections	1	1.98	1.98	18.02	0.0004
Subjects by Quarter	20	2.20	0.11		
Quarter Two Reflections	2	0.53	0.26	3.48	0.0404
Subjects Within	40	3.03	0.08		
Quarter Reflections Within	2	0.97	0.49	7.51	0.0017*
Error	40	(2.59)	(0.07)		
Total	125	12.73			

Note. Values enclosed in parentheses represent mean square errors.
*p < .05.

3) levels of reflection (Level 1). During quarter two, most of the ratings were found between the lower (Level 2) and intermediate (Levels 3 and 4) levels of reflection. During quarter three, most of the ratings were found between the intermediate (Levels 4 and 5) and higher (Level 6) levels of reflection. It was observed that the ratings moved progressively from lower to intermediate and in some cases to higher levels of reflection. Overall, 90% of the participants gained in levels of reflection from quarters one to three.

The overall mean of reflection for quarter three (M = 4.43) was significantly higher than the means for quarters one (M = 2.59) and two (M = 2.76). This showed a growth over the three quarters of two levels (see Table 5).

Table 6 summarizes a repeated measures two factor ANOVA which was conducted to test for completely within subjects effects on field experiences rated using Galvez' (1995) levels of reflection.

This analysis revealed that the within subjects interaction between (a) quarters one and three, and (b) quarters two and three reflections was statistically significant ($F_{(4, 80)} = 12.78$, $p < .05$)). A post-hoc Tuckey test confirmed that these interactions were statistically significant at an experiment wise error rate of .05. The main effects then revealed that most of the cells were significantly different. These results indicated that Galvez' (1995) level of reflection achieved in quarter three was significantly higher than the level of reflection achieved in quarters one and two. These data indicated that journal entries based on student teaching (quarter three) were written at a significantly higher level of reflection than journal entries from the field experiences during quarters one and two.

Table 5
Galvez' Levels of Reflection on Field Experiences in Frequencies, Percentages, and Means

Levels	Quarter 1						Quarter 2						Quarter 3					
	R1		R2		R3		R1		R2		R3		R1		R2		R3	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%
Level	0	0	0	0	0	0	1	5	1	5	0	0	0	0	0	0	0	0
Level 1	4	19	7	33	7	33	3	14	3	14	0	0	0	0	0	0	0	0
Level 2	6	29	3	14	4	19	9	43	9	43	6	29	2	9	2	9	3	14
Level 3	4	19	6	29	6	29	3	14	3	14	7	33	1	5	1	5	2	9
Level 4	2	9	4	19	3	14	3	14	3	14	3	14	5	24	5	24	9	43
Level 5	5	24	1	5	1	5	2	10	2	10	5	24	8	38	8	38	7	33
Level 6	0	0	0	0	0	0	0	0	0	0	0	0	4	19	4	19	0	0
Level 7	0	0	0	0	0	0	0	0	0	0	0	0	1	5	1	5	0	0
Totals	21	100	21	100	21	100	21	100	21	100	21	100	21	100	21	100	21	100
M	2.91		2.48		2.38		2.48		2.48		3.33		4.67		4.67		3.95	
Overall					2.59						2.76						4.43	
SD	1.48		1.29		1.24		1.33		1.33		1.16		1.28		1.28		1.28	
Overall					1.21						1.13						1.12	

R1 = Rater 1; R2 = Rater 2; R3 = Rater 3; F = Number of Ratings; % = Percentages

Table 6
A Repeated Measures Two Factor ANOVA Completely Within on the Field Experiences

Source	df	SS	S	F	P
Subjects	21	110.74			
Quarter Reflections (One & Three)	2	130.17	65.09	20.12	0.0001
Subjects by Quarter	40	129.39	3.24		
Quarter Reflections (Two & Three)	2	0.77	0.39	0.77	0.4707
Subjects Within	40	20.12	0.50		
Quarter Reflections Within	4	19.93	4.98	12.78	0.0001*
Error	80	(31.19)	(0.39)		
Total	188	442.30			

Note. Values enclosed in parentheses represent mean square errors.

*p < .05.

During the data analysis, it was observed that the journals' content corresponded to the Reflective Processes component of Boud et al.'s (1985) Model and was the expected outgrowth of the first component (Experience). The analysis using Ross' (1989) and Galvez' (1995) frameworks, provided insights not only about the level of reflection that the participants achieved but also about how the level of reflection varied across quarters (Reflective Processes). This analysis also revealed that the journal entries did not represent elements of Boud et al.'s third component (Outcomes) even though the participants had opportunities to do so.

Conclusions

In this study, preservice teachers were asked to participate in reflective activities, but they were not specifically trained in reflection or reflective thinking. Over two quarters, even without training, the average levels of reflection on readings did increase significantly from Ross' (1989) lowest to moderate levels of reflection, that is from Level 1 to Level 2. Over three quarters, even without training, the average level of reflection on field experiences did increase significantly from Galvez' (1995) lowest to intermediate levels of reflection, that is from Level 2 to Level 4. These results appear to align with Dewey (1904) and Kuhn (1986) who suggest that, in effect, preservice teachers learn to reflect by reflecting.

There could be several explanations for our results. First, the results may be related to the length of the study (three quarters) which allowed sufficient time for changes to be measured. A second possible explanation may be the age, greater maturity, or experiences of some of the participants. Third, some connection between requisite cognitive ability and learning may have occurred during this period that promoted a change in level of reflection.

Fourth, the fact that the level of reflection during student teaching (quarter three) was significantly higher than the levels of reflection achieved during field experiences (quarters one and two) may be related to the nature of the student teaching experience. That is, student teachers are totally involved in the field experience, whereas during quarters one and two, the field experiences are linked with methods courses and there is little involvement in classroom teaching. This explanation would lend support to other researchers who have found that the greatest growth in reflection occurs in the field experiences, that is, in real classroom settings (Bolin, 1988; Dewey, 1933; Roth, 1989; Liston & Zeichner, 1987).

Only one participant in the study demonstrated the highest level of reflection (i.e., analyzing teaching situations from multiple perspectives, and evaluating and adjusting one's own teaching performance in response to children's individual differences). Most participants achieved only intermediate levels of reflection.

Explanations for these results may include the following. First, they could be due to the lack of specific training for the participants in reflection and reflective thinking. Second, the participants may not yet have developed the (pre)requisite cognitive abilities that would enable them to move towards the highest levels of reflection. Third, there may exist some cognitive processes related to reflection that are not adequately measured by the two selected frameworks.

Our findings suggest that when preservice teachers are given opportunities to reflect over time, many do grow in their level of reflection even without specific training. However, it seems clear from these results that simply asking preservice teachers to reflect will not turn them into practitioners who consistently reflect at the highest levels, at least not over a three quarter period of time.

In terms of limitations of this study and recommendations for future studies, this sample size was small and the nature of the sample, being at the graduate level, limits our ability to generalize these findings to other populations. Further studies should be designed to replicate this work with undergraduate preservice teachers. A limited number of frameworks were used to assess levels of reflection, and future studies should also include other frameworks such as Van Manen's (1977) and Zeichner and Liston's (1985), which would allow direct comparison of a variety of theoretical frames. One framework should also be applied across differ-

ent types of data (journals) in order to identify possible differences in achieved levels of reflection.

Further empirical studies are needed to measure achieved levels of reflection over a longer period of time. Such studies would help to determine whether the growth rate continues when preservice teachers are given opportunities to reflect, but are not given specific training in reflection. Related studies are also needed to investigate possible relationships among cognitive developmental maturity, critical thinking skills, and achieved levels of reflection over time.

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