



EFFECTIVENESS OF GROUP REFLECTION ACTIVITY FOR PROFESSIONAL GROWTH OF PROSPECTIVE TEACHERS DURING PRACTICE TEACHING

(ÖĞRETMENLİK UYGULAMASI SIRASINDA KULLANILAN GRUP
YANSITMA ETKİNLİĞİNİN ÖĞRETMEN ADAYLARININ PROFESYONEL
GELİŞMELERİ ÜZERİNDEKİ ETKİLİLİĞİ)

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ABSTRACT

This study involved students who were enrolled in the 3rd semester of a Master of Educational Research and Assessment program at the Institute of Education and Research during their teaching practicum. The purpose of the study was to examine the effectiveness of group reflection activity in professional growth of practicing teachers during practice teaching. The data was collected from eleven students who were videoed during teaching practice. The selection of students to be videoed was made on the basis of their grades in pedagogy related courses on campus. Five students with the highest grades and six students with the lowest grades were selected for this purpose. Each student was assessed through peer observations during practice teaching sessions. The data was collected through twenty-seven observations. Twenty-two observations were taken before the reflection sessions and five after the reflection sessions. During the reflection session they were shown their recorded videos along with summary statistics of peer observations. The activity helped in identifying strengths and weaknesses of each participant evident during teaching. The effect of the reflection sessions was clearly visible on their performance during post reflection peer observations. This effect was generally uniform for both high achievers and low achievers. There is little conclusive evidence that performance in pedagogy related courses can be helpful in predicting the difference in the ability to learn from self and group reflective activities in general.

Keywords: Prospective Teachers, Teaching Practice, Professional Growth, Reflective Activities, Theory and Practice

ÖZ

Bu çalışma, öğretmenlik uygulaması sırasında Eğitim ve Araştırma Enstitüsü bünyesindeki Eğitim Araştırma ve Değerlendirmesi yüksek lisans programının 3. dönemine kayıtlı öğrencileri kapsamaktadır. Bu çalışmanın amacı, öğretmenlik uygulaması sırasında kullanılan grup yansıtma etkinliğinin öğretmen adaylarının profesyonel gelişmeleri üzerindeki etkililiğini araştırmaktır. Katılımcıların seçilmesi, pedagoji temelli derslerden aldıkları notlar baz alınarak yapılmıştır. Bu amaç doğrultusunda, beş tane en yüksek not alan, altı tane de en düşük not alan öğrenci seçilmiştir. Her bir öğrenci, öğretmenlik uygulaması dersi sırasında akran gözlemleri kullanılarak değerlendirilmiştir. Veriler yirmiyedi gözlem sonucunda toplanmıştır. Yansıtma oturumu öncesinde yirmiiki gözlem, sonrasında ise beş gözlem yapılmıştır. Yansıtma oturumu sırasında öğrencilere kaydedilmiş videoları gösterilerek akran gözlem istatistikleri özet halinde sunulmuştur. Yansıtma oturumlarının etkileri, yansıtma sonrası akran gözlemlerinde açıkça görülmüştür. Bu etki yüksek başarılı olanlarla, düşük başarı sahiplerinde genellikle tek tip olarak gözlenmiştir.

Anahtar sözcükler: Öğretmen adayları, öğretmenlik uygulaması, profesyonel gelişme, yansıtmacı etkinlikler, kuram ve uygulama

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INTRODUCTION

Teacher's capacity to reflect is regarded as one of the important elements in the professional development of teachers (Bengtsson, 1995). Therefore, a wider agreement is seen among educators in promoting some form of reflective habits which should be practiced among prospective teachers to improve their teaching skills (Bell, 2001). The term is being used very subjectively by different authors making it worthwhile to discuss its scope and synthesize the literature before embarking on operational meaning used in this paper. The varied meaning associated with "reflection" are; an enquiry oriented habit which helps teachers to become adaptive and to engage in self monitoring leading to professional growth (Tom, 1985 cited in Srimavin and Darasawang, 2004), to interrogate one's own thoughts or actions (Barnett, 1992), the active, persistent and careful consideration of any belief or supposed form of knowledge in the light of grounds that support it and the further conclusion to which it tends (Dewey, 1993), to include thinking, feeling, and acting, whereas it's strong focus is on rational analysis (Korthangen and Vasals, 2005).

The variety of meanings associated with 'reflection' actually confuses readers instead of clarifying the meanings. This makes it essential to define the term operationally before proceeding any further. In this research, the range of professional development activities for which use of reflective process is advocated, include the sharing of experiences, the honest acceptance of critical feedback from peers and the identification / exploration of new possibilities for professional action. It is assumed that inner dialogue is the source of initiation of aforementioned developments (Schon 1983; Serimavin and Darasawang, 2004).

Reflection and its role in training activities

In fact, developing reflective practitioners has become the core element in many professional education programmes such as medical, nursing and teacher education (Tang, 2002). Reflection activity is essential ingredient of teacher education programmes as teaching is highly skill oriented, thoughtful, and practice based innovative profession (Chappell, 2007).

In the educational context, reflection is regarded as a way of thinking about educational matters that involves the ability to make rational choices and assume responsibility for those choices (Mok, 1994; Kuit et al., 2001). Reflective practice involves a meta-cognitive approach in which professionals observe their own actions, evaluate them in light of theory, and use that theory to generate and monitor improvements in their own practice (Tang, 2002).

Researchers and practitioners have used reflection to examine reasoning strategies related to their workplace and environment (Edenfield, 2007). Through reflection activity professionals develop qualities like curiosity,

commitment, and self – confidence (Korthagen and Vasalos, 2005; Willies and Davies, 2002; Chappell, 2003).

The increasing use of reflection as a tool of professional development in practical based courses has guided reforms in the teacher education programmes in the recent past. The emphases is shifting from theory laden courses to more practical nature of work opportunities (Clark, 1986) like greater proportion of teaching practice, internship or induction in schools. Self reflection is one of the most critical features of mentioned modes of shift towards practical training and real - life experience.

Professional education in general should develop in students their conceptions and theories of the profession which allow them to generate best practice (Iqbal & Mahmood, 2008). To achieve this aim, professional education involves not only developing student's competencies in content knowledge and professional attitudes, but also provides opportunities for students to reflect on their experience and practice in order that they might see how their practice could be improved (Betty, 1998). The same point of view was put forward by Epestein and Hundert (2002) as, cognitive and emotional self- awareness is necessary to help professionals in getting new information, and adjust their inner self because experience does not necessarily lead to learning and competence.

Despite the prevailing enthusiasm about the potential role of reflection activities in professional development, it is important to realize that although reflection is an essential part of our professional development, it does not promote professional development if a change to practice is not made after reflection (Chappell, 2007). This observation is supported by commonly existing strong realization that the theory of teaching has developed tremendously over years but practice in classroom does not correspond to it (Brookfield, 1995; Pollard, 2002). The potential explanation for that difference is the separation of theoretical knowledge and actual teaching in classroom. The root of this widening gap rests in design and quality of teacher training programmes. There is hardly any demand of reflective activities imposed by the courses during training. This gap needs to be reduced by providing more opportunities to prospective teachers to synchronize theoretical understanding with practice through reflective activities during teaching practice (Tang, 2002).

Reflective activities and professional development of teachers

There is ample evidence in literature that reflective practice is an essential skill of effective teachers (Candy, 1996; Peters, 1991; Kemmis and Mc Taggart, 1988; Brookfield, 1987). This skill enables teaching practitioners to articulate the components of their work that lead to successful outcomes, thus supporting their own professional development and their ability to mentor and develop others (Shor, 1980).

The process of reflective activity supports the development and maintenance of professional expertise. We can conceptualize successive levels of expertise in teaching- those that prospective teachers may attain at the beginnings, middle and end of their courses (Pollard, 2002). The process of reflection thus feeds a constructive spiral of professional development and capability.

Reflective professionals will thus be able to draw on reflective activities and use them to inform their teaching practice. Reflective activities set out the standards of teaching, skills, knowledge and understanding through which teachers can monitor their progress and aid the planning of their professional development (DfEE, 2000).

In summary, our view is that the notion of reflection applies throughout professional life but in different ways. Novice teachers, such as those in initial teacher training, may use reflection to improve on specific and immediate practical teaching skills. Competent teachers may use reflection as a means of self consciously increasing understanding and capability. In these ways reflective teaching has a place throughout the profession from trainees to competent teachers.

This study was designed to pursue the prospective teachers to utilize the learning from reflective sessions, embedded in course design. It was assumed that this activity will capacitate them realizing the importance of reflection and ultimately improve their post-reflection sessions teaching practice.

METHODOLOGY

This section of the paper will describe context of the study, design, nature of participants, development of instruments and procedure of data collection.

Context of the study

This paper is based on part of the data collected through multiple sources during an eight week teaching practice activity carried out by students of a master's degree programme at IER for partial fulfillment of their degree programme. The students who participated in this teaching practice had already completed courses in educational psychology, curriculum and instruction and methods of teaching. These courses were aimed at providing them with sufficient theoretical understanding of the principles guiding student's learning, suitability of various teaching methods in context of the content to be taught, the art of effective planning and execution of lessons and techniques of becoming effective teachers. These courses along with their individual experiences help them in imagining themselves as teachers of their own choice.

The distinctive feature of this teaching practice was not to present any model of effective teacher to them or force them to become any kind of teacher envisioned by the supervisor as best model. Instead the students were

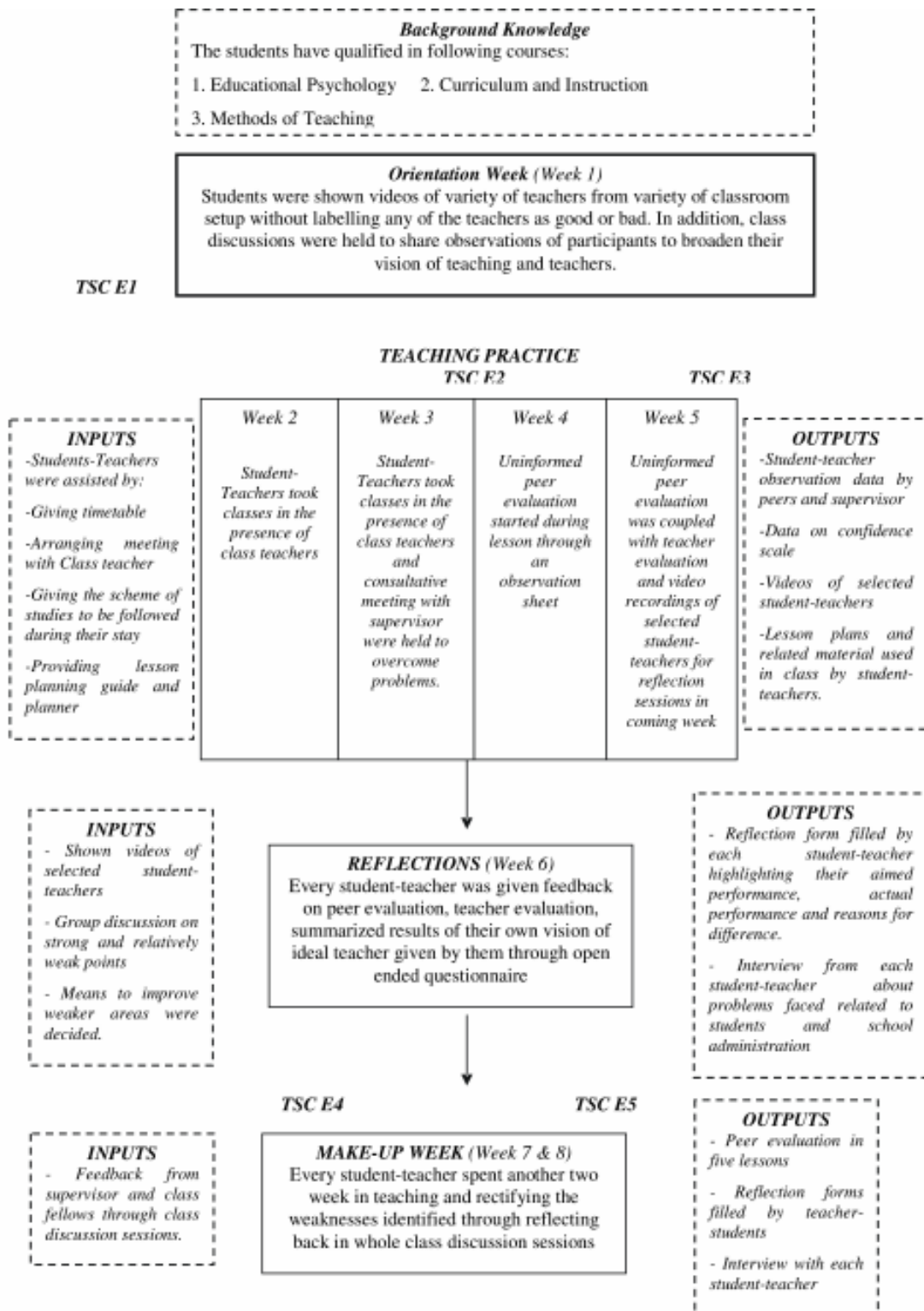
encouraged to become the teacher of their own ideals. They made it explicit that what kind of teacher they wanted to become through responding on an open ended questionnaire in which respondents described their views on the role of preparedness of content, nature of permitted involvement of students in the class, teacher response to students questions as indicator of students centered teaching, provision of space for student initiative, instructional methodology, interpersonal relationship and performance assessment.

A picture of each participant's envisioned teacher was deduced from their responses on the above mentioned questionnaire. It was predicted that student teachers would be more accurate, comfortable and convenient in their act of teaching when they were given opportunity of self assessment through group reflection activity.

Design of the study

The study encompasses various aspects of the eight week teaching practice resulting in different types of data, collected through questionnaire, observations, class discussions, group reflection and individual interviews. All of this data is not directly used in this paper but it is elaborated in Figure 1 to give an overview of the context in which group reflection effects were studied. These various inputs and design of conducting teaching practice may have influenced the teaching pattern changes observed.

An observation schedule was compiled using the repeatedly reported perceptions relating to six perceived factors of classroom teaching included in open-ended questionnaire. The evolved schedule was probably a representative tool of classroom observation as far as the image of an ideal teacher was perceived by this group of subjects. This schedule was used to record observations of students teaching at two times. Twenty-two observations were made during four weeks of teaching practice in the first phase of teaching at school. During this practice teaching eleven student teachers were videoed as well. Then, group reflection activity of one week was carried out in which prospective teachers were provided with descriptive statistical measures (mean and standard deviation) calculated by using the observational data gathered through peer observation on observation schedule. In addition to this, empirical data the video recordings of each prospective teacher were shown to the whole group. Prospective teachers were required to record the differences they noticed between their practice in classroom (as observed through video) and their perception recorded earlier in the open-ended questionnaire about their concept of teacher and teaching. The process was aimed at enabling them realize the gap between their role as teacher and their practices. It was assumed that realization of gap will assist in making up this gap during post reflection teaching. After reflection session, there was again two weeks of teaching practice to minimize the gaps between expectations and practice. During this phase they were again observed by five peers on same observation schedule.



TSC: Teacher Confidence Scale E1: Execution 1 E2: Execution 2 E3: Execution 3 E4: Execution 4 E5: Execution 5

Figure 1: Design of the Eight Week Teaching Practice Course

Nature of participants

Participants of the study were students enrolled in 3rd semester of a Master of Educational Research and Assessment program at the Institute of Education and Research during their teaching practice. Eleven students were selected out of twenty five on the basis of their achievement (reflected in the form of grades) in three pedagogy related subjects as listed in figure 1. Five students of high grades (75% and above marks in pedagogy related courses) and six students of low grades (50-74% marks) were selected for data collection.

Instrument

The instruments for measuring effect of the group reflection activity were observation schedule and reflection form. Their detail is given below.

i. The observation schedule was based on six components identified through literature review and prospective teachers' perceived meaning of selected elements of classroom teaching. The detailed description and scope of each selected sub-construct of observation schedule is given in table 1.

ii. Reflection form was a semi-structured open-ended questionnaire consisting of questions based on the same components included in the observation schedule. The reflection form aimed at highlighting the gaps between theoretical ideas of prospective teachers about teaching after studying pedagogy related subjects and actual experience of teaching in the classroom. There were six questions in the reflection form whereas question no.3 had five sub questions.

Procedure of data collection

The data was collected from eleven students who were videoed during teaching practice. The selection of students to be videoed was made on the basis of their grades in pedagogy courses on campus. Each student was observed by peers during practice teaching sessions. The data was collected through twenty-seven observations. Twenty-two observations were taken before the reflection sessions and five after the reflection sessions. During the reflection session they were shown their recorded videos along with summarized descriptive (like mean and variance) of peer observations on preparedness of content, nature of permitted involvement of students in the class, provision of space for student initiative, instructional methodology, interpersonal relationship, performance assessment. The activity aimed at bringing forth the classroom practices of selected prospective teachers as observed by peers, actual classroom practices (through video recordings), to allow, whole class in general and videoed teachers in particular, to compare following three phenomena.

1. How do the peers rate selected prospective teacher's performance in class?
2. How does the selected prospective teacher himself/herself rate his/her teaching in practice?
3. Reflect on to his/her previously reported self images as teacher and actual practice in class.

Table 1. Description, Scope, Number of Items and Example of Observation Scale

Sub-construct	Scope	No. of items	Example	α
1. reparedness of content	Teacher's command on content being delivered assessed through teacher's confidence, student's reaction towards teaching and their level of satisfaction on the content explained	3	Used examples from real life situations beyond textbook to explain concept studied	0.320
2. Nature of permitted involvement of students in the class.	The timing and frequency allowed by teacher to students for interrupting him/her during the lesson	5	Willingly accepted students' interruption during lesson for asking lesson related questions.	0.538
3. Provision of space for student initiative	Creating opportunities for the students to speak their mind with room for improvement in communication skills, meaningful learning, involvement of shy students and teaching to avoid confusion while communicating	5	Students crossed questioned frequently.	0.361
4. Instructional methodology	Method/Methods of instruction being used in the class.	4	Methods of teaching were same as stated in this stage of lesson plan.	0.247
5. Interpersonal relationship	Teacher's humbleness, fairness and sincerity towards students in his dealing with students in class.	4	Bias free	0.519
6. Performance Assessment	Activities used to assess the student learning in the classroom	5	Teacher visited students while they were working in groups.	0.659

Scale reliability = 0.774

RESULTS

To observe differences in pre-reflection and post-reflection lessons in teaching related skills, the students were classified into academically high and low performance groups.

Table 2. Comparison of Pre- and Post-Reflection Changes in Teaching Related Skills of All Sampled Students, Academically High Performing Prospective Teachers and Academically Low Performing Prospective Teachers.

Teaching Skills	Observations	All Sampled Students					Academically High Performing					Academically Low Performing				
		N	Mean	SD	df	t	N	Mean	SD	df	t	N	Mean	SD	df	t
Preparedness of content	Pre-reflection	235	9.45	2.072	256.08	10.861**	97	8.04	0.776	120	1.013	138	10.44	2.124	137.0	13.507***
	Post-reflection	55	7.95	0.229			25	7.88	0.332			30	8.0	1.423		
Nature of permitted involvement of students in the class.	Pre-reflection	235	17.81	2.990	115.15	-3.466*	97	16.90	2.988	65.41	-4.396**	138	18.46	2.829	166	-1.044
	Post-reflection	55	18.98	2.041			25	18.92	1.730			30	19.03	2.297		
Provision of space for student initiative	Pre-reflection	235	21.81	2.503	143.18	-5.145**	97	21.04	2.954	93.47	-5.003**	138	22.36	1.966	166	-2.205*
	Post-reflection	55	23.11	1.423			25	23.00	1.258			30	23.20	1.562		
Instructional methodology	Pre-reflection	235	13.81	3.143	287	-5.907**	97	13.86	3.512	120	-5.624**	137	13.77	2.867	165	-2.667**
	Post-reflection	55	16.56	2.980			25	18.08	2.597			30	15.30	2.706		
Interpersonal relationship	Pre-reflection	235	21.23	2.035	135.13	-7.390**	97	20.76	2.178	75.80	-7.113**	138	21.55	1.868	166	-2.928**
	Post-reflection	55	22.78	1.212			25	23.00	1.118			30	22.60	1.276		
Performance assessment	Pre-reflection	235	23.70	4.801	104.03	-3.259**	97	19.58	3.322	120	-5.631**	138	26.59	3.341	166	-0.895
	Post-reflection	55	25.58	3.604			25	23.64	2.752			30	27.20	3,458		
Sum of all factors	Pre-reflection	235	107.85	11.078	137.24	-6.236**	97	100.18	7.617	63.03	-12.016**	137	113.29	9.871	165	-1.060
	Post-reflection	55	114.96	6.529			25	114.52	4.547			30	115.33	7.871		

* $p < 0.01$, ** $p < 0.001$, Number of prospective teachers involved (N_{pt}) = 11

* $p < 0.01$, ** $p < 0.001$, Number of prospective teachers involved $N_{pt} = 5$

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, Number of prospective teachers involved $N_{pt} = 6$

Professional growth of prospective teachers in selected teaching related skills

The data in Table 2 can be looked from two dimensions i.e. the changes observed through noticing changes in descriptive statistical measures (mean and standard deviation) and differences on various teaching related skills by using inferential statistics. The results in the table 2 showed change in the performance of prospective teachers in all teaching related skills measured before and after reflection sessions. Academically high performing prospective teachers have shown statistically significant change in all teaching related skills except preparedness of content while in academically low performing prospective teachers, the change was observed in four teaching related skills out of the six observed. It showed academic excellence as one of the factor in professional self-learning of the prospective teachers.

Although change has been significant but size of the change varied considerably across the teaching related skills. The first of the teaching related skill observed was preparedness of the content. There were three items related to measurement of this skill on six point scale making possible a score range of 3-18. The observation schedule items focused on measuring the confidence with which prospective teachers presented the content in the class, prospective teacher's attitude towards content related questions asked by the students and student's visible level of satisfaction on the content explained by the teachers. The mean score of the selected prospective teachers remained 9.45 and 7.95 in pre- and post-reflection observations. The score showed a general lack of preparedness of content on part of all selected prospective teachers which decreased marginally after the reflection session. This decrease was significant for academically low performing prospective teachers but academically high performing students changed marginally on this particular teaching related skill.

Second teaching related skill measured through observation was the nature of permitted involvement of the student. This was measured by observing the nature and timing of the questions asked and opportunities for the students to share their experiences relevant to the lesson discussion. Academically high performing prospective teachers allow students to ask questions at any time during the lesson and share relevant experiences more than academically low performing prospective teachers.

A significant increase in the prospective teachers' capacity to provide space to students for taking initiatives in pre- and post-reflection observations was observed in all prospective teachers. There were five items for observing this change which focused on prospective intentional effort to provide opportunity to students for speaking their mind, encouraging meaningful learning through listening to their ideas and involving whole class especially shy students in class discussions. The change in mean scores (as given in table 2) indicated the shift of emphasis among prospective teachers in favor of

greater student involvement in general and involvement of relatively shy students particularly.

The fourth aspect of teaching related skills observed was selection of instructional methodology. It is evident that all sampled prospective teachers irrespective of their academic competence showed significant increase in pre and post reflection means but the size of change was maximum in academically high performing prospective teachers (mean difference in pre- and post-reflection was 4.22) as compared to academically low performing prospective teachers (mean difference in pre- and post-reflection was 2.53).

The fifth component of observation was interpersonal relations measured through four indicators rating prospective teachers for their fairness towards students, providing friendly environment for sharing, and valuing student's importance as individual and demonstrating impartiality. Although a significant change in mean scores in pre- and post-reflection observation was found for both academically high and low performing students was observed but the size of improvement was almost twice in prospective teachers of academically high performance (mean difference in pre- and post-reflection was 2.24) as compared to academically low performing prospective teachers (mean difference in pre- and post-reflection was 1.05).

The sixth and last component used to find professional growth of prospective teachers was their skill to assess student's performance. Assessing students competently and effectively reflects the teacher's growing know how of the purpose of teaching. There were five items used to measure the change in prospective teachers' means of assessing student's progress in classroom. The academically high performing prospective teachers showed a change of 4.08 in their mean score in post-reflection observations as compared to a marginal change of 0.61 in academically low performing prospective teachers.

Extent of change in high and low performing prospective teachers

The results in table 3 showed that there is a difference between prospective teachers with respect to their ability to change their teaching following the reflection activity, and that difference is related to their academic performance in academic subjects.

Table 3. Observed Difference in Classroom Teaching during Pre and Post - Reflection Lessons of Academically High and Low Performers.

Descriptive	High Performing Prospective Teachers		Low Performing Prospective Teachers	
	Pre-reflection	Post-reflection	Pre-reflection	Post-reflection
N	5	5	6	6
Average number of observations for each students	20	5	23	5
Median	100	114	111.75	119
Negative Rank (N_n)		0		2
Positive Rank (N_p)		5		4
Z-value		-2.023*		-1.572
Effect size		-0.43		-0.33

* $p < 0.05$

Wilcoxon Signed Rank test revealed a statistically significant improvement in pre- and post-reflection performance of academically high performing prospective teachers, $z = -2.023$, $p < 0.05$, $T=0$, with medium effect size ($r = -0.43$). The median score increased from pre-reflection ($Mdn = 100$) to post-reflection ($Mdn = 114$).

For academically low performing students, observed change in pre- and post-reflection observations was statistically non-significant. Despite being statistically non-significant the median score of post reflection ($Mdn = 119$) was higher than pre reflection ($Mdn = 111.75$) marginally. Wilcoxon Signed Rank test reported $T=2$, $p < 0.05$, $z = -1.572$ and $r = -0.33$.

DISCUSSION

It was interesting to note that prospective teachers grouped as academically low performing were rated high in both pre- and post-reflection on the observation schedule by peers, thus, indicating a disjoint between academic performance and classroom practice of prospective teachers. The results provided sufficient evidence to argue that reflective activities have positive effect in professional growth of prospective teachers irrespective of the grouping (high performing and low performing) used in this research. The size of the change resulting from pre- and post-reflection sessions was in favor of academically high performing prospective teachers. This suggests that having theoretical pedagogical knowledge as priory, provides greater potential to learn when experiencing transition from theory to practice. It suggests that stronger theoretical background counts in quickly working out individual deficiencies once they are highlighted effectively.

It can be argued that theoretical understanding of pedagogical principles and theories is necessary condition for becoming professionally competent

teacher but it may not be a sufficient condition. The real experience of teaching embedded with frequent feedback is essential in learning the art of teaching. The students with strong theoretical background practically have greater chances of getting benefit from reflective activities in terms of making up their deficiencies.

There were six teaching related skills focused in this study and change was observed in almost all of them for the whole group while academically high performing prospective teachers showed change in all of them except preparedness of content. The group of academically low performing prospective teachers showed change in four (preparedness of content, provision of space for student initiative, instructional methodology and interpersonal relationship) out of six teaching related skills observed.

Generally, academically high performing prospective teachers have developed themselves as a result of reflection activity but a negative impact of reflective activity was seen on their preparedness of content. It showed that besides having positive effect, reflection activity can make the prospective teachers conscious of their deficiencies (which may need a longer time to make them up) which can effect the confidence in short term when prospective teacher go to class after the reflection session. They felt hesitant in taking student questions, thus making students less satisfied with their preparedness of content. This was a natural consequence of knowing personal deficiencies, which can only be made up through a conscious effort on the part of the prospective teachers over a reasonably longer period of time.

The results also showed that expertise in content has direct relationship with the way and timing a teacher permits students to ask question. The teachers who are comfortable with content, their teaching was found more welcoming to the student's questions and were at ease allowing students to share their relevant experiences and integrate their experiences as resource in their teaching. An improvement in this skill after the reflection session advocates reflection as contributive tool towards professional development of prospective teachers.

Another effect of reflective activity was seen in the increased capacity of prospective teachers in providing space to the students for participating in class activities and asking questions, thus showing rising confidence among the prospective teachers and trust in their skill of handling students' autonomy.

One more manifestation of effectiveness of reflective activity was seen when prospective teachers having better knowledge of content showed greater improvement in their selection and use of instructional methodologies. Therefore, the results imply the importance of content expertise in growing one-self as professional teacher. It showed that prospective teachers can benefit well from such professional development activity when they have sound content subject knowledge along-with pedagogical skills.

In conclusion, it can be said that group-reflection activity is a legitimate

source of professional development and its effects are likely to be relatively long lasting as it emerges from self-realization of strengths and weaknesses of the participating teachers experiencing the reflective activity.

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