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Understanding the Dynamics of Internship Experience: The Case of the Hashemite University Preservice Primary Science Teachers

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Abstract: *This study attempted to understand the dynamics of internship experience at the Hashemite University in Jordan. A qualitative research approach was used to answer the research questions. Data collected in this study were derived from participants' interviews, classroom observations, and teaching artifacts. Among twelve preservice science teachers, three were chosen to collect the needed data. Results of the study provided evidence that the internship period is a stressful experience for intern students. Lack of help and support from school principals and cooperative teachers were among the major difficulties that faced participants. The study suggests that internship experience is a critical stage for new teachers and should be made easy to them with the help and support of all members involved in the internship program. This research also provides strategies to help intern science students employ inquiry-based teaching strategies in their teaching. (**Keywords**: Internship, Intern Students, Activity Theory, Inquiry Based Teaching, Hashemite University.)*

فهم ديناميكية التربية العملية لدى معلمي العلوم في المرحلة الابتدائية في الجامعة الهاشمية في الاردن

أحمد قبلان، كلية العلوم التربوية، الجامعة الهاشمية، الزرقاء، الأردن،

ملخص: سعت هذه الدراسة الى فهم ديناميكية التربية العملية لدى طلبة تدريس العلوم في الجامعة الهاشمية، باستخدام استراتيجية البحث النوعي، إذ شكلت المقابلات الشخصية، والملاحظات الصفية، وتحليل الأدوات التدريسية، المصادر الأساسية في جمع المعلومات لهذه الدراسة. وقد تم اختيار ثلاثة من الطلبة الذين شاركوا في البرنامج خلال الفصل الدراسي الثاني ٢٠٠٥/٢٠٠٦ ليمثلوا عينة الدراسة. وتوصلت نتائج الدراسة إلى أن تجربة التربية العملية ليست بالسهلة من وجهة نظر المشاركين، وأن نقص الدعم والمساعدة من مديري المدارس المتعاونة ومعلميها شكّل محور هذه الصعوبة. وقد أوصت الدراسة بضرورة تقديم القائمين على البرنامج المساعدة والدعم بجميع أشكالها للطلبة المتدربين. وبالاضافة الى ذلك، قدمت الدراسة استراتيجيات مقترحة من شأنها مساعدة الطلبة المتدربين على توظيف استراتيجيات التدريس المستندة إلى الاستقصاء في تدريسهم. (**الكلمات المفتاحية**: التربية العملية، تدريس العلوم، نظرية النشاط، التعليم الاستقصائي، الجامعة الهاشمية، الاردن)

Introduction:

Teacher preparation programs are considered important cornerstones in the efforts of reforming education (Brunkhorst, Brunkhorst, Yager, Andrews, and Apple, 1993). Researchers indicate that the student teaching experience can have positive and negative consequences (Koehler, 1988). Although this phase of the preservice teacher's preparation is deemed "essential in training and helping future teachers develop pedagogical skills" (Slick, 1997, p. 714), the student teaching experience has been routinely criticized (Hoy & Woolfolk, 1989). One of the criticisms of that experience includes the lack of an explicit curriculum during the student teaching experience which is described by Stones (1984) as an apprenticeship, where good teaching is to be caught and not taught. Another criticism includes the lack of integration between the student teaching experience and the university coursework (Hoy & Woolfolk, 1989). Furthermore, there are some criticisms about the small amount of research on preservice education; as Anderson and Mitchener (1994, p.28) note "there is a small amount of research on preservice education [and what exists] is rather limited in scope and usefulness" (p.28). These and other criticisms signify that preservice teacher programs are stagnant, ineffective, and unresponsive to the changing needs of future educators (Schnur & Golby, 1995; Kennedy, 1990).

However, to address these criticisms, few researchers (Lederman, Gess-Newsome, and Zeidler, 1993) called for empirical research that could inform the practice of science teacher education. Moreover, other researchers (Adams & Krockover, 1997, p.302) note that much of the research on science teacher preparation curriculum will be of limited value "if we do not learn how thinking about teaching develops, which of the teaching practices provided in methods courses are actually employed by students, and determine the types of experiences that are important for the preservice teachers when they enter the profession."

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It is apparent, therefore, that there is a need for additional research projects in the area of preservice teacher education (Slick, 1997). The need is especially urgent for the Jordanian context as most universities in Jordan are restructuring their preservice teacher preparation programs. However, addressing the deficiency in the research can not be complete without considering the multiple facets and elements involved in preparing science teachers (i.e., teacher beliefs and knowledge of teaching practices, cultural expectations and norms, and the tools available for such work). Thus, this study is intended to answer the following questions (a) What are the personal and contextual elements that are involved in the internship activity of preservice primary science teachers?, and (b) How do these elements interact with each other? To address these questions, the cultural historical activity theory (CHAT) (See figure 1) was employed to explore the multiple personal and contextual elements involved in the internship activity of purposefully selected interns during their internship experience.

Theoretical Background

The Cultural Historical Activity Theory (CHAT) was chosen as the theoretical lens for this study. CHAT is recognized as having the capability to enable researchers to consider the multiple facets and elements that interact with the studied social phenomena. This frame requires a serious consideration of the structural, cultural, and historical features that shape the teaching activities. Another important aspect of CHAT is its focus on the analysis of contradictions in the system, that is the features of a system that clash (Roth, Tobin, Elmesky, Carambo, McKnight, and Beers, 2002). Given its emphasis on contradictions, CHAT promises to help illuminate the facets that allow for or inhibit the teaching activity of intern science students.

CHAT stems in part from Vygotsky's (1978) theory of mediated activity that describes all purposeful human activities as accomplished through the use of physical and/or psychological tools. The use of these tools can only be understood within their sociocultural and historical context. Engeström (1987) produced a diagram of the activity system (Figure 1) in which the triangle in the upper half of the figure depicts the relationship between subject and object as mediated by cultural tools.

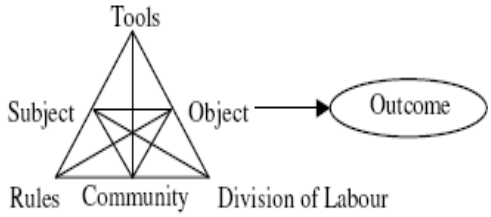

Figure 1: The Activity System

This upper triangle describes individual learning with relations between the subject, object, and mediational artifacts. The lower half of the diagram shows that individual learning is mediated not only by cultural tools, but also by the community of practice, communal rules and divisions of labor.

Engeström (1999) also distinguishes between the *object* of an activity and its *outcome*. For example, the *object* is not momentary, but it is broader than what individual actions would accomplish. Individuals can have *objects* toward which they move with individual actions, but the *outcome* is something that all individuals accomplish in their collective activity.

The concept of *contradiction* is an important one in CHAT (Engeström, 1987; Roth, et.al, 2002). A *contradiction* is a conflict or clash within components of the activity system that prevents attainment of the object or outcome of that system. By identifying contradictions in an activity, we can identify areas where improvements can be made. Although contradictions can be sources in which the activity is limited or altered, through addressing these contradictions the activity system can be enhanced. Thus, contradictions can be a driving force of change and development for that system (Kärkkäinen, 1999).

Engeström (1999) identifies two continuously operating processes in the activity system: *internalization* and *externalization,* which together form an *expansive cycle* for that system. The expansive cycle can lead to the transformation of a system, in which contradictions are limited and the system more effectively results in the desired outcome. In the expansive cycle, the subject of the activity first *internalizes* the existing structure of the activity. Afterward, if critical self-reflection occurs the subject may make alternations to the system to reduce contradictions. This process of modification is the *externalization* component of the expansive cycle. Any system that does not externalize its emerging contradictions will stay inside a non-expansive cycle and reproduce the existing culture that support the status quo.

Figure 2 represents the system of the internship activity for this study; it includes the consideration of the subjects in a classroom context and in the larger social, political, and educational contexts. However, it is important to note that while CHAT allows one to focus on personal and contextual influences. The research reports on the nature of personal and contextual contradictions that interns face in their teaching activity.

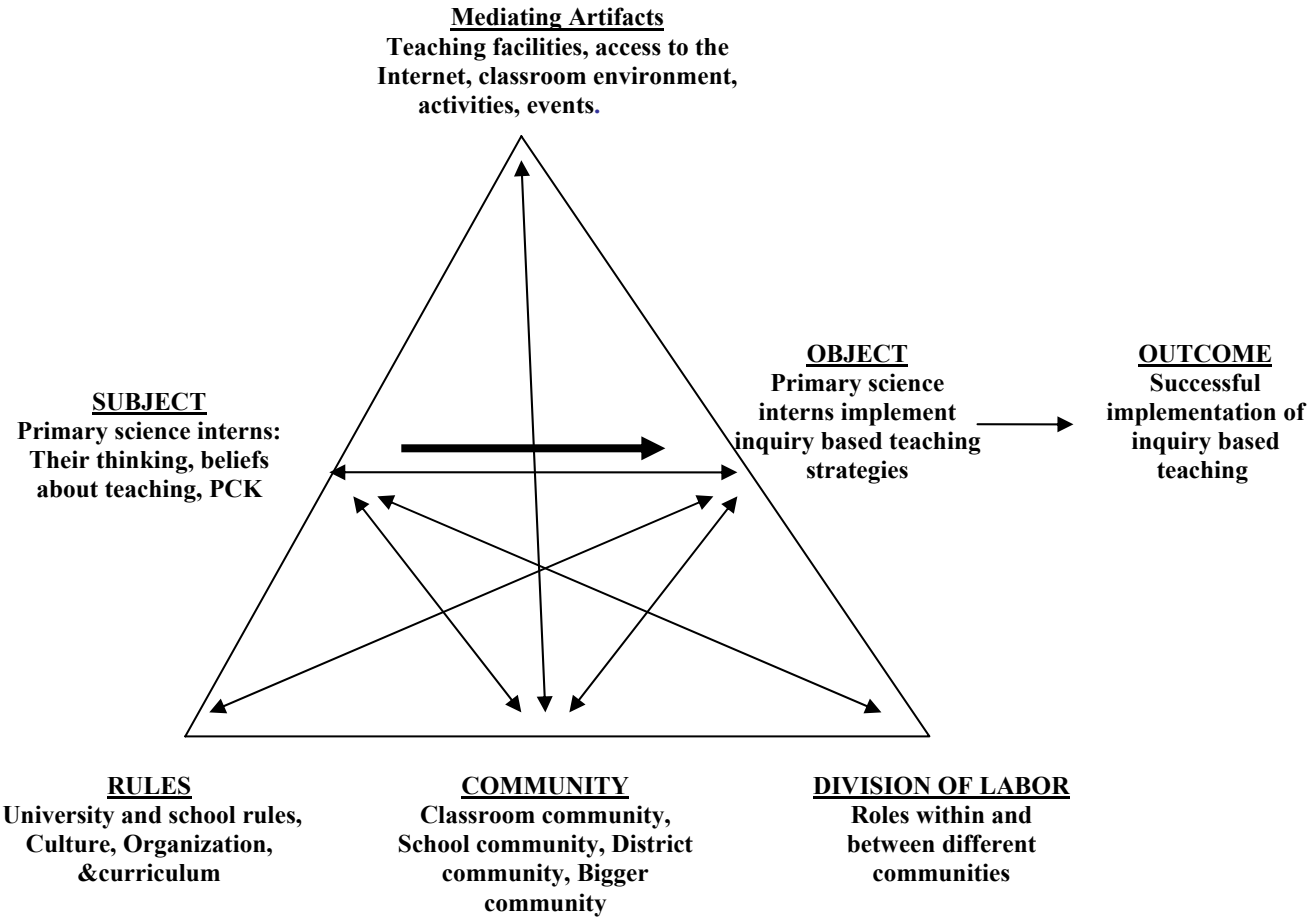

Figure 2: Internship Activity System of Preservice Primary Science Teachers.

The *subjects* of the activity system at the center of this study will be three primary science interns who participated in the internship program in the department of curriculum and instruction at the Hashemite University. The *communities* of the activity system would involve their classroom communities, university community, district community, and local community. The *mediating artifacts* would represent their teaching facilities and materials. The *objects* would be the three science interns employing inquiry based teaching strategy and the *outcomes* would represent their successful employment of that strategy.

Design and Methods

Given the descriptive and complex nature of the research questions, qualitative research methodology (Taylor & Bogdan, 1998) appeared to be useful to answer the questions of this study. As a research tool, qualitative research methodologies enable researchers to understand in a more holistic way the meanings people have of their experiences (Glesne, 1999). In this study, a multiple case study methodology was used to collect data. The main source of data derived from a series of in-depth interviews with selected participants; in addition, several classroom observations and artifact analysis were used to better understand the dynamics of internship experience of the participants in this study.

In attempting to understand the dynamics of internship experience of the participants in this study, more attention was paid to understanding the various personal and contextual (i.e., cultural, historical, communal) elements that surround the preservice primary science teachers in their classrooms. However, in analyzing the data, the researcher paid a particular attention to how particpants in this study viewed the tensions, inconsistencies that inhibited their implementation of inquiry based teaching methods in their teaching.

Context

The research site of this study was the science classrooms of twelve internship students who pariticpated in the internship course in the spring semester 2005/2006 and were supervised by the researcher himself. These participants were senior primary education students in the Department of Curriculum and Instruction at the Hashemite University, Zarqa, Jordan. Senior primary education students at this university are required to intern for one academic semester in selected public schools to practice their

teaching. During their internship period, interns work with both cooperative teachers and university supervisors to advance their teaching experience in dealing with various real classroom issues. While cooperative teachers are supposed to guide interns locally at schools, university supervisors make several visits to their interns to help them advance their teaching skills with the help of the cooperative teachers.

Research Participants

All twelve participants in this study were Jordanians who had graduated from Jodanian high schools. All of them were enrolled in a 6-hour practicum course in the spring semester 2005/2006, where each of them was required to teach science to primary stage students (grades1-4) through inquiry based teaching methods.

Data Collection

Multiple data collection methods were employed in this study. The primary method was participant interviews that revolved around the perceptions of the interns about their internship experience; the cultural, social, and historical influences that interfered with their teaching experience; the sort of problems they faced during their internship period, and the suitable solutions for their problems. All interviews were conducted with the students and recorded and transcribed for analysis.

In addition to participants' interviews, the researcher conducted several classroom observations of the interns to better describe the elements that surrounded them and the way these elements shaped their teaching. According to Bogdan and Biklen (1998), participant observation consists of an in-depth and intensive observation of the activities, people and physical aspects of the situation being studied. The third method of data collection was an artifact analysis of personal and institutional documents that belonged to the subjects of this research (e.g. course syllabi, university rules, school rules,and student portfolio).

Data Analysis

Data collected in this study were categorized using the six elements of CHAT (see figures 1 and 2). All data within a category were searched for emergent themes that provided provisional answers about the relationships among and within the data (Coffey and Atkinson, 1996). That process helped in building connections among the extracted themes to establish relevant relationships and connections (Miles & Huberman, 2002).

The textual materials (i.e., student portfolio) were analyzed in the light of the emergent themes. As in any qualitative study, rigor is a major factor that shapes data analysis. To ensure the rigor of the findings of this study, the researcher followed Patton's (1990) strategy of triangulation. Patton (1990) recommends considering multiple data sources to support proposed themes. In addition, CHAT itself ensures the triangulation of the research design by requiring the examination of many facets of the broader activity.

Member checking was another strategy that the researcher used to ensure the rigor of his findings (Glesne, 1999). To do so, he shared the tentative results of his data analysis with three of his colleagues in the Department to ensure that the data were analyzed correctly. However, since the language of all collected data was Arabic, all excerpts used in the following case studies were translated into English (Sperber, Devellis, & Boehlecke, 1994) with three bilingual faculty members from the college of educational sciences at the Hashemite University. Furthermore, to confirm that the translation process was accurate and reflected the meaning that the interviewees meant, each participant was given her written case study and feedback was considered in correcting any comment from the particpants.

Results

The Case of Sara

Sara, the second grade teacher, was a senior undergraduate student who was bilingual in both Arabic and English. As she mentioned in one of her interviews, she chose to enter the primary education program herself, where part of her interest to be a teacher originated from her belief that teaching is the profession of prophets. That belief was clearly stated in one of her interviews, she said:

> *I entered the primary education program to be a successful teacher in the future because I believe that teaching is a great career, especially when I think that our prophet, was a great teacher for this nation. I feel so happy when I give my students new information. (J. Sara Interview)*

For that reason, Sara intended to maximize her benefit from her internship expeirence. She believed that her internship was essential because it gave her a chance to practice what she believed in. She indicated:

> *My internship experience is very important to me since I think I will work as a primary teacher after my graduation. I believe that I need to have some experience in dealing with various real life issues before I enter the profession. (J. Sara Interview)*

Those beliefs played an important role in shaping Sara's teaching. Throughout her internship course, Sara seemed very excited to make her students love science for the sake of helping them realize their future dreams. She argued:

> *I want to make my students love their school and particularly science because if they loved their school they will be creative and realize their dreams in the future. (J. Sara Interview)*

To acheive such goal, Sara employed a learning cycle strategy that was explained to her by her academic supervisor at the beginning of the internship course. Furthermore, she used a role playing to make science more "tangible" to her students, which was obvious in her teaching practices.

However, employing the learning cycle strategy inside the classroom was a challenge for Sara as her students were accustomed to learning through traditional teaching strategies. Sara's challenges had

several roots; one of these roots was her cooperative teacher's discomfort with using learning cycle as a teaching strategy in the classroom.

> *My cooperative teacher was a big obstacle on my way to teach through learning cycle… she did not only disliked my use of the strategy, but also she discouraged me from bringing some teaching materials and doing some teaching activities inside the classroom. (J. Sara Interview)*

The rejection of Sara's cooperative teacher did not only discourage Sara from conducting inquiry teaching activities, but also tried to impose her teaching beliefs and perspectives on Sara by saying "students need a tough teacher who enforces memorizing the information regardless of whether they understood the content or not". Sara mentioned:

> *My teacher tried to convince me that students need only to memorize the information and write them down on their exams… it does not matter whether they understood the information or not… I can give them the information at the beginning of the class and use the rest to correct their assignments. (J. Sara Interview)*

In addition to that discourgment, Sara experienced another serious discouragement from her cooperative school's principal, who was supposed to give the school's score for Sara at the end of the internship course. Sara mentioned:

> *Unfortunately my school's principal did not come to my class or watch my teaching although she will give me the final grade at the end of my internship. I question, basis on which my principal will give me the grade. (J. Sara Interview)*

In addition to these school related discouragements, another complaint, related to the availability of teaching artifacts in the school, was explained by Sara, she mentioned:

> *I have difficulty finding some basic teaching materials in my school. The books in the library are very old, there is also no internet access to bring some new teaching ideas to the class. (J. Sara Interview)*

Despite these hurdles, Sara was motivated to teach innovatively by employing the strategy of the learning cycle inside her classroom. That motivation seemed to have multiple sources. One of these sources was the encourgement of her academic advisor, who helped her solve some of her teaching problems.

> *The important source of my excitement to teach was my academic advisor, who frequently gave me help and support. (J. Sara Interview)*

Another source was the interest of her students' parents, who used to regularly check with Sara about their kids.

> *The second source of my motivation was the regular checking that I got from my students' parents. They usually came to my class and asked me about their kids and that was making me so happy and excited. (J. Sara Interview)*

A different sort of obstacles that faced Sara during her internship period derived from the rules of her school and those imposed by university internship program itself. One rule of the cooperative school concerned organizing the excused-leave of interns. As Sara mentioned, the school did not accept any excuses from her to leave in emergency cases. She mentioned:

> *The rule of emergency leave at our school was really hard. I had serveral emergency conditions that required me to leave, but my school adminstator did not allow me to do so. (J. Sara Interview)*

Although Sara's school might be excused for conducting such action but accepting interns legitimate excuses is essential especially that interns are still temporary teachers.

The other serious problem for Sara was the rules of her internship program. Particularly, Sara complained about the grades' distribution in the program. She said:

> *I really dislike the distribution of our grades in the internship course. I really find it unfair and I believe that there is a chance for subjectivity in grading our files. (J. Sara Interview)*

Summary

Lack of support from cooperative school's principal, cooperative school's rules, and the cooperative teacher were the most apparent contradictions that faced Sara during her internship experience. These contradictions interfered with Sara's implementation of inquiry based teaching methods inside her classroom, yet she was, to some extent, sucessful in employing those methods with the encouragement of her university superviosr. Similar contradictions were observed in the case study of Angelica.

The Case of Angelica

After spending almost one month moving from one class to another, Angelica finally became a third grade teacher. Angelica is a young lady in her early twenties. At first sight, Angelica seems serious, thoughful, and highly dedicated. Unlike Sara, I was introduced to Angelica on site, when I visited her at school.

Similar to Sara's case, Angelica chose to do her Bachelor in primary education because she viewed teaching as a good future career. She put forth a clear object from her teaching at the beginning of the semester. Her object revolved around getting her students to love and enjoy nature and be able to connect their theoretical knowledge to their life. In one of her interviews, she mentioned:

> *I want my students to understand their surrounding environment. I want them to pay careful attention to natural events and phenomena (e.g. plants, the moon, and the sun). (S. Angelica Interview)*

To bring that object into reality, Angelica percieved her internship experience as a unique opportunity to apply what she learned throughout her university education. She stated:

> *I think that our internship program offers me a good opportunity to practice what I learned and it really did! (S. Angelica Interview)*

The analysis of Angelica's teaching beliefs indicates that she believed in employing inquiry based teaching inside her classroom, when asked to describe her teaching, she mentioned that she mainly employs

the learning cycle strategy because it helped her students learn and keep their information longer. Angelica believed in asking her students certain questions to make them better understand their surrounding environment. She mentioned:

I mainly employ learning cycle in my teaching. That is in addition to using discussion and questionning approaches to help my students better understand science. (S. Angelica Interview)

Angelica knew about the learning cycle from both her university courses and from her internship supervisor. She stated:

I learned about learning cycle from my university courses as well as from my internship supervisor who explained it to us at the beginning of the program. (S. Angelica Interview)

Angelica appeared very confident about her teaching. Her confidence grew after she realized her success in involving her students in doing science. An example of that invovlement was the happiness that her students showed during her science classes. When she replied to my question whether she found difficulties with her students while using the learning cycle, she said:

No, on the contrary, my students loved it. Their participation in the classroom was very high. They expressed their happiness several times. (S. Angelica Interview)

However, Angelica's happiness was not unbroken; several challenges stood in her way while trying to employ the learning cycle strategy. One of these challenges was the shortage of the instructional artifacts in the school, which forced her to bring all her teaching artifacts from outside the school. She complained:

The materials that I use in my teaching differ from class to class. I need various types of instuctional materials to pursue my teaching the way I like. The problem is I don't find all these materials at school. I have to bring them with me from home which is far away from the school. (S. Angelica Interview)

Another serious challenge for Angelica was the conflict in dividing the teaching responsibilites with her cooperative teacher. While most perceive that internship teachers are supposed to take off most of the original cooperative teacher's responsibilites, others emphasize that internship teachers are still practicing and can not handle the classroom issues by themeselves. In Angelica's case, however, her cooperative teacher was overlapping Angelica's teaching and in some cases postpones the assignments that Angelica assigns to her students for the sake of doing other assignments, possibly signifying unhappiness with Angelica's work. Angelica mentioned:

There is no collaboration or coordination between us. For example, if I assigned an assignment for my students, my teacher postpones it until I came back to school, which may result in confusing the students. (S. Angelica Interview)

Despite these problems, Angelica continued to be a strong advocate of the learning cycle strategy. Her persistence in using that strategy was obvious throughout the semester. That motivation originated, in part, from the parents of her students. Angelica mentioned:

The happiness and encourgment of my students' parents is a big motivation for me. Many parents thanked me form making their kids love science. They really do care. (S. Angelica Interview)

Summary

The shortage of instructional materials and the conflict in dividing the teaching responsibilites with the cooperative teacher were the most noticeable contradictions that faced Angelica during implementing inquiry based teaching methods. Although Angleica experienced tough obstacles, she was successful in employing the learning cycle, the strategy that Angelica believed was right to use in order to teach science meaningfully in her teaching. The following case study of Jameleh addresses similar obstacles that require urgent solutions.

The Case of Jameleh

Jameleh is a good example of a person who loves to learn. Her personal characteristics attract others' respect and appreciation. Those characteristics, however, have greatly helped Jameleh attract her students' attention during her science classes.

In addition, becoming a real educator was Jameleh's ultimate goal. From Jameleh's perspective, real educators are those who do not only teach or pass valid information to their students, but also offer advice on unacademic issues such as communicating with others, being honest, and other personal ethics.

What I plan to be in the future is a real educator for my students. In addition to giving them information, I want them to be good people who have ethics. (F. Jameleh Interview)

Form Jameleh's perspective, one component of being a good educator was to concentrate on both theory and practice. Jameleh believed that teachers who emphasize only the theoretical facet of teaching are not sucessful teachers.

The problem is to focus only on the theoritical aspect of teaching. I believe that good teachers should have both theory and practice at the same time. (F. Jameleh Interview)

Perhaps, Jameleh developed her teaching beliefs from her past experience when herself was a student. As she mentioned in one of her interviews, she did not like science or even learning science when she was young. However, that negative experience encouraged her to reverse her negative feelings into positive ones and make her students love science through the use of both theory and experiments. She mentioned:

The ultimate goal of my science teaching is to make my students enjoy learnig it; personally, I did not like it during my pre-university education but I began to appreciate it during my university life. That was not my fault, but it was my teachers' fault. (F. Jameleh Interview)

Jameleh found that using learning cycle helped her in accomplishing her goals. She stated:

> *I think that using the learning cycle strategy helped me making my science teaching more interesting. I loved learning science through this strategy because it makes science very interesting. (F. Jameleh Interview)*

Indeed, accomplishing Jameleh's goals was not an easy feat. As she mentioned, she encountered various obstacles while teaching through the learning cycle. One of these challenges was the rejection of her cooperative teacher to use such new teaching strategy. Jameleh said:

> *The rejection of my cooperative teacher to use learning cycle inside her classroom was one of the obstacles I faced. My cooperative teacher rejects any new teaching strategy although my students loved my way of teaching. (F. Jameleh Interview)*

Another serious problem for Jameleh was the lack of sufficent teaching materials. She mentioned:

> *Teaching materials are not available in my school. Even if some are available, they don't allow us to use them. Therefore, I bring my own teaching materials from home. (F. Jameleh Interview)*

A third obstacle that Jameleh faced in her teaching originated from the rules of the internship program itself. According to Jameleh, the relatively short time that she spent at school was not sufficient to track her students' progress. That challenge became tougher because her cooperative teacher was not interested in using that strategy, which resulted in confusing students. Jameleh mentioned:

> *I spend less time than I need at school. I only come on Mondays and Wednesdays. My cooperative teacher does not teach by learning cycle, which may confuse the students. (F. Jameleh Interview)*

Summary

In addition to the cooperative teacher's refusal to implement inquiry based teaching strategy, the lack of sufficient teaching materials and the rules of the internship program itself constituted significant obstacles in Jameleh's teaching. These obstacles prevented Jameleh from fully implementing inquiry based teaching methods in her teaching, a problem which faced the other participants in this study.

Discussion

The examination of the aformentioned case studies reveals that these interns do share a common set of obstacles in their internship course (see figure 3). As suggested in the results, neither intern in this study was successful in achieving her object of implementing inquiry based teaching in her classroom. Their instruction was altered due to the various contradictions that they faced during their internship period. The attainment of their original object of implementing inquiry based teaching would require transformation in their context. The analysis of the contradictions in their systems is an important step in allowing for such transformation.

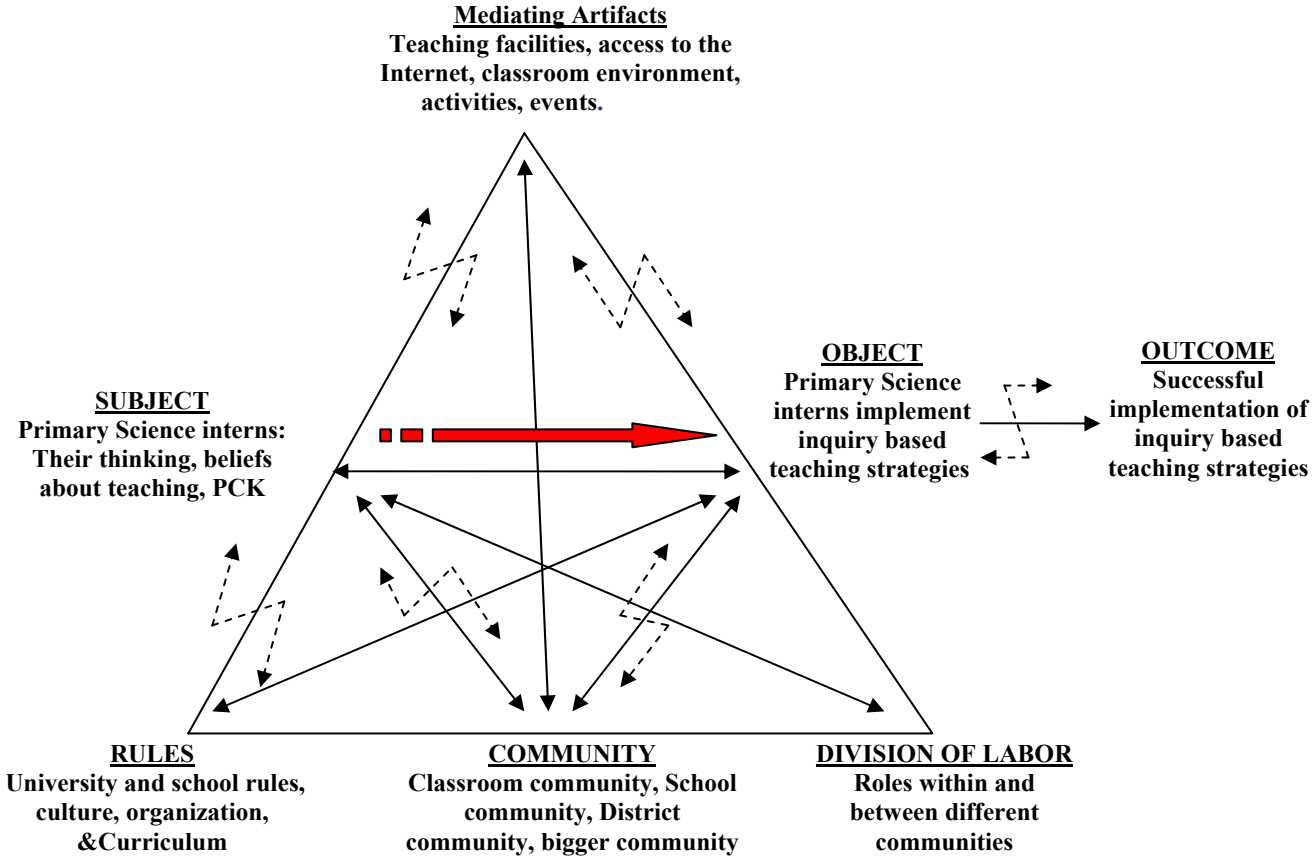

Figure 3: Interns' Activity Triangle that Depicts the Various Contradictions in their System.

The three interns at the heart of this study encountered serious contradictions in their internship activity. As shown in Figure 3, all participants experienced similar sets of contradictions: contradictions between rules and (object and subject), between community and (object and subject), and between instrument and (object and subject), where the discouragement of the cooperative teachers of these interns was the toughest contradiction they experienced throughout the semester.

Despite that discouragement, all interns continued to teach science through inquiry with the support of their university internship supervisor. This is not surprising as the continuous reformulation of the object is a normal response to the imbalances and contradictions that the subject sees in the system (Engeström & Miettinen, 1999; Kärkkäinen, 1999). If these contradictions are not addressed through some means of transformation, then the system may become non-expansive and lead to the reproduction of the status quo (teaching through traditional strategies). That expansive cycle that all particpants demonstrated was supported by their strong beliefs in using inquiry based teaching strategies.

According to CHAT's literature, in any activity system, subjects can respond to the contradictions in their systems by either changing the elements of their systems that produce the contradictions or accommodating the contradictions and changing or reformulating their object to make it more attainable. The subjects in this study challenged their contradictions and continued to employ inquiry based teaching strategies in their classrooms. Therefore, the reformulation of their object resulted in widening or expanding the object (Kärkkäinen, 1999), a reformulation that Engeström (1987) called expansive learning.

It is important to note that the widening of the object of these interns occurred due to two major factors, the encouragement of their university internship superviosr and their strong belief in employing inquiry based teaching strategies that they learned during their university education. These two factors, however, could be unsustainable in the sense that these interns could reach a burnout stage (Haberman, 1991) and stop challenging their contradictions if these contradictions exceeded their tolerance limit.

Thus, if we are to move toward helping these and other interns to *sustainably* implement inquiry based teaching strategies in their classrooms, resolving the contradictions identified in this study appears to be crucial (Brickhouse and Kittleson, in press).

Implications: Resolving The Contradictions

The literature indicates that there are several constraints that face science interns implementation of inquiry based instruction (i.e. learning cycle). The lack of administrative and collegial support (Brickhouse & Bonder, 1992; Emmer, 1986; Loughra, 1994) was one of the most important contradictions that face preservice science teachers. This contradiction was indicated by the participants of this study as shown in the following excerpts.

> *I imagined that our school's principal will support us and cheer us up but unfortunately she did not support us or even come by our classes all semester long. (F. Jameleh Interview)*
>
> *Our school principal was not cooperative at all and did not even watch my teaching. (J. Sara Interview)*
>
> *Neither my cooperative teacher nor my school's principal was cooperative or encouraging. (S. Angelica Interview)*

The value of working in a supportive environment was continually noted by these interns as Angelica mentioned:

> *Considering that I am an intern student and I lack sufficent teaching experience, I need a cooperative teacher who has a good teaching experience and whose able to aid me in diagnosing my mistakes and correcting them. (S. Angelica Interview)*

Interns and new teachers' need for support is well documented in literature on teacher attrition (Gold, 1996). Interns and new teachers need continued mentoring and support in the field as they begin to experience and reflect on what it means to teach in inquiry-based learning environments (Jacobsen & Lock, 2004; Jacobsen, Clifford & Friesen, 2004).

Interns need various types of support in managing the classroom, mastering content knowledge, and implemening inquiry-based teaching methods (Black, 2004; Windschitl, 2002). In the case of this study, the participants received little support in all these areas, and particularly, they lacked any type of support to implement inquiry oriented teaching methods, their prospective teaching object.

In addition, the lack of logestic support (e.g. teaching material, and lab equipment) was another serious obstacle that faced these interns. The current case studies support the ideas presented by Haberman (1991); and Teel, Debruin-Parecki, and Covington (1998) that intern teachers have tremendous constraints that challenge their ability to implement pedagogy of any kind, including inquiry pedagogy. The specific constraints identified in this study were:

- Inadequate space, equipment, and outdated instructional materials.
- Inadequate prep time to plan and reflect on a new program.
- Limited instructional freedom and/or lack of administrative support.

According to Haberman (1991), if these constraints are prevalent, they can result in predictably difficult student behaviors and resulting teacher burnout. He indicates:

> *The classroom atmosphere created by constant teacher direction and student compliance seethes with passive resentment that sometimes bubbles up into overt resistance. Teachers burn out because of the emotional and physical energy that they must expend to maintain their authority every hour of every day (p.291).*

In addition to these prevalent constraints, the teaching mission of participants of this study was further complicated when their cooperative teachers discouraged them from implementing inquiry teaching methods and adopt, instead, the traditional teaching methods or what Haberman (1991) called the pedagogy of poverty.

This pedagogy of poverty, brought about cooperative teachers of these interns, is characterized by teacher-controlled activities such as giving information, tests, directions, and grades; monitoring seat work; settling disputes; and reviewing tests and homework. This pedagogy also includes a set of beliefs, such as "teachers are in charge and responsible" that often run counter to those that support inquiry science and those that motivate these individuals to become teachers in the first place. Haberman (1991) argued that the pedagogy-of-poverty teaching practices are so common in urban classrooms that "a teacher in an urban school of the 1990s who did not engage in these basic acts as the primary means of instruction would be regarded as deviant".(P291)

Perhaps a possible explanation of why these cooperative teachers tried to perpetuate their pedagogy of poverty to their interns is their adherence to what they learned about teaching and learning. That explanation becomes more plausible when considering that these teachers graduated 20 years ago and have spent several years in teaching without having continuous professional development during their years of work. These factors might increase their resistance to change and maintain their pedagogy of poverty.

Although there are certainly many obstacles, there are intern students like those in this study, who are fairly successful in bringing some inquiry practices into the classroom. A possible explanation of that success is their strong belief in the merit of using such progressive teaching strategy.

In discussing the influence of teachers' beliefs on their inquiry practices, Keys and Bryan (2001) call for research on inquiry-based science teaching that focuses on teacher beliefs about inquiry, teachers' knowledge base for implementing inquiry, and teacher-designed inquiry based instruction. Participants in this study gave us the opportunity to examine how prospective teachers can successfully challenge their obstacles and bring inquiry practices into their science classrooms. However, collegial and adminstrative support are precursors of such success.

Creating a list of recommendations is a much simpler task than finding ways to implement them. Also, recommendations for individual teachers seem much more likely to occur than those recommendations whose target is the structure of the academy. However, as the teacher education literature is careful to point out (Cuban 1990; Woodbury & Gess-Newsome, 2002), change in teachers without accompanying structural changes is doomed to long-term failure. Implementation of the above mentioned recommendation can help Jordanian universities better serve their community by calling attention to the need for supporting preservice teachers with the needed support to make their transition to the real work life easier and smoother.

Summary

This study has provided evidence that internship period is a stressful experience for preservice teachers. That critical stage for any new teacher should be made easy with the help and support of all members involved in the internship program (academic supervisors, school principals, and cooperative teachers). Systematic support for fostering inquiry including principal and collegiate support is crucial for those teachers to ease their mission in implementing inquiry-based teaching strategies.

The literature of science education shows that beginning teachers should be provided with the required support to encourage them to use inquiry teaching methods in their teaching and turn them from adopting the pedagogy of poverty for the sake of transforming the way science is taught in our schools.

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