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Teachers' Perceptions Related to Characteristics of a Professional Environment for Teaching

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The purpose of this study was to determine pre-service and in-service science and mathematics teachers' perceptions of the characteristics of a professional teaching environment. The study further investigated the relationships of field placement contexts and grade levels on pre-service teachers' perceptions of importance and availability of certain aspects of a professional teaching environment. The teacher perceptions were assessed using the Professional Environment for Teaching Survey (PETS). The responses reflecting the teacher perceptions of importance were subjected to a principal component analysis and two components were identified. These were Resources for Teaching and Recognition of Teacher Contributions. Data obtained from pre-service teachers who (were) enrolled in a graduate teacher education licensure program at a large Midwestern university and from in-service teachers who were mentors for the pre-service teachers. Correlation and forward stepwise multiple regression analyses of the data suggested that the perceptions of importance and/or availability of those pre-service or in-service teachers with more experience were related to the academic degree they held and the content that they were teaching or expecting to teach. Results for the in-service and pre-service teachers' perceptions were discussed in terms of characteristics of a professional teaching environment.

Keywords: Science teacher perceptions, professional development, professional teaching environment.

INTRODUCTION

Professional development of teachers is generally understood to relate to activities such as graduate courses, seminars, workshops, and conferences that teachers attend as a part of their in-service training. These one-time developmental activities or programs are not seen as realistic approaches for helping teachers' professional development and professionalization of teaching. Thus, these types of professional development activities are far from having a lasting effect on systemic educational reforms. Professional development should be an integral part of teachers' lives as professional teachers and is essential for educational reform.

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Professional Development

The vision of professional development advocated in the National Educational Goals (U.S. Department of Education, 1996) includes activities such as self study, group study, inquiry, action research, and collaboration with educators and scientists. The aim of these professional development activities is to improve teachers' interests in teaching and ability to teach science and hence to improve student learning. Promising high-quality education for all students depends on school improvement and committed

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State of the literature

- Although numerous studies have been conducted on science and mathematics teachers' professional development (PD) around the world, studies have mostly focused on professional development needs, PD programs, and assessment of these programs.
- Professional development of science and mathematics teachers through teacher research is important and should be addressed by both researchers and teachers.
- Professional development of science and mathematics teachers, all other teachers as well, is regarded as important. However, research falls short on investigating characteristics of a professional teaching environment where teachers work as professionals.

Contribution of this paper to the literature

- This study advocates teachers as an integral part of an educational reform. The study investigating characteristics of a professional teaching environment (PTE) which is regarded as important for teachers, aims to help teachers grow professionally.
- By investigating the importance and availability of certain aspects of a PTE, this study can identify characteristics of a PTE which in turn can help educators in designing professional teaching environments for teachers.
- This study found that pre-service and inservice teachers may have different perceptions of characteristics of a PTE. Resources for Teaching and Recognition of Teacher Contributions were regarded as important by teachers. Teachers' teaching assignments and placement context is also found significant in their perceptions of characteristics of a PTE.

professional teachers. In order for teachers to be leaders in school restructuring, they need to be provided with meaningful professional development experiences (Wei, Darling-Hammond, & Adamson, 2010). This view of professional development is recognized in the Mission and Principles of Professional Development (U.S. Department of Education, Professional Development Team, 1996). Professional development, as envisioned in this document, refers to "rigorous and relevant strategies, and organizational supports that ensure the career-long development of teachers and other educators whose competence, expectations and actions influence the teaching and learning environment" (¶ 2). This document recognizes the teachers' role in educational reform and the need for appropriate conditions or environments that promote and support the professionalization of teachers (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009).

The National Science Education Standards (National Research Council [NRC], 1996) recognizes professional development as a key component of the science education system. In the National Science Education Standards' vision:

> Teachers should have opportunities for structured reflection on their teaching practice with colleagues, for collaborative curriculum planning, and for active participation in professional teaching and scientific networks. The challenge of professional development for teachers of science is to create optimal collaborative learning situations in which the best sources of expertise are linked with the experience and current needs of the teachers. (NRC, p.58)

A powerful way for teachers to improve their practice is to conduct formal and informal classroom-based research. In this type of research, teachers ask questions about how students learn science, try new teaching methods, and evaluate the changes in students' achievement as a result of these methods (Archibald, Coggshall, Croft, & Goe, 2011; NRC, 1996). The position statement of the National Science Teachers Association (National Science Teachers Association [NSTA], n.d.) on professional growth states that:

> Teachers must continue to grow professionally, and life-long-learning must be supported. Learning opportunities tailored to the point or need should be available to enhance teachers' decision-making and activities. Any behaviors that contribute to professional growth should be supported and rewarded. Learning opportunities should also include teachers as reflective practitioners who do research on their own experiences and their students' experiences, thus continuing to increase the knowledge base of the profession. (section 6)

Professional development is not a "resource-inadequate teacher training that teachers, administrators, and policy makers do not see as a process for enhancing the professional status of teachers" (Klapper, 1995, p. 2). Professional development, as it is used in this study, is something that:

> (a) provides teachers the resources to continue extending (through both self-learning and external presentation) their mastery of content and pedagogy, their goals that benefit the institution and its teachers; (b) allows teachers as a collegial group to establish the conditions of their working environment, to establish and maintain (by peer review) the standards to which teaching and teachers will be held, and to formulate the ethical framework that guides their professional behavior; (c) works to build a cultural/social authority that is

> the basis of professionalism for teachers; (d) supports teachers engaging in critical self-reflection and analytic/systematic teachers to pursue innovation within the classroom, school, school district, and the enterprise of teaching. (Klapper, 1995, p. 2)

It is argued that to improve the teaching and learning of science and mathematics, high quality teachers are essential. Increasing the quality of teachers requires efficient professional development programs and professional learning environments (Archibald, Coggshall, Croft, & Goe, 2011; Chval, et al., 2008). The majority of professional development programs are criticized for not taking teachers' expectations, experiences, knowledge and constraints into consideration and hence providing ineffective results (Melville & Yaxley, 2009). For example, Cibulka and Nakayama (2000, p. 6) indicated one of the crucial faults of the current professional development efforts "the goals and content of these efforts is prescribed for teachers, rather than by them." Darling- Hammond and Sykes (1999) also criticized the current practices as:

> Focusing on district-mandated, generic instructional skills of teachers "trained" as individuals by an outside "expert" away from their job site. Because this training is fragmented, piecemeal, and often based on instructional fads, it is viewed as a frill, easily dispensed with in tough financial times. Perhaps most damaging, these workshops, although they often respond to expressed teacher needs, are seldom explicitly linked to what schools expect students know and be able to do. (p. 134)

Professional Teachers

Dass (1999) describes a professional science teacher as the one "who teaches science to impact student learning in multiple domains, whose instructional strategies are based upon research-based rationales, and who is reflective about his/her practice" (p. 13). Packard (1993) has described the professional teacher as a master communicator, a researcher, and a scholar. Professional teachers use positive communication in their interpersonal relationships with students or parents or the other staff in the school. Professional teachers are at the same time good researchers. Using multiple observation techniques, they can find their students' understanding levels or skills and prepare instructional materials according to these findings. Professional teachers learn from their research continually. Professional teachers must be scholars in various related educational and social areas. They continually seek and apply new methods, knowledge, and understandings of subject matter and pedagogy to help all students to be educated" (Lederhouse & Morrison, 2000; Loucks-Horsley et al., 2010). With these characteristics, teachers not only will teach all students successfully, but also improve themselves as professionals.

Teachers are being confronted by a variety of expectations regarding their work. Policy makers, educators, parents, principals, and society in general, have expectations about teachers' work. Questions such as "how do teachers, themselves, view their work; what do they consider important?" (van Veen, et al., 2001, p. 176) must be regarded as important and taken into account when considering educational change. In other words, it is important that teachers' perceptions of their teaching environments must be investigated and understood in order for educational reforms to be successful. The resources and support systems for teachers to design and implement new teaching and learning methods and to develop the knowledge and skills they need for self-inquiry into their own teaching strategies are insufficient for an effective teaching and learning process to take place, and for a meaningful and effective implementation of the curriculum (Berlin, Klapper, & White, 1995). It is important that teachers be prepared according to what is expected of them.

Professional Development and Systemic Change

This study advocates professional development through teacher professionalization. This standpoint accepts professional development as a vehicle for systemic educational change and improvement (Templin & Bombaugh, 2005). It is argued that professional development is a starting point or vehicle for change in the educational system (Wei, Darling-Hammond, & Adamson, 2010). Berlin et al. (1995) suggested that the "individual teacher as a professional, can facilitate systemic change in the school building, the district, and the community" (p. 1). However, teachers will not attain the status of professionals until they obtain all the attributes of professionals. They proposed a professional development program that "attempts to 'professionalize' teachers through their practical research in their own classrooms with collaboration of partners from higher education and business and industry" (p. 1). The National Center for Science Teaching and Learning (NCSTL) conducted research on factors influencing science teaching and learning. Three such studies looked at the factors that affect the professional status of K-12 science teachers. One of these studies was an action research program. The Berlin-White Action Research Model (BWARM) was developed focusing upon action research designed to prepare and support teachers in the development, implementation, and evaluation of innovation in their classrooms (Berlin, 1995). Berlin reported that,

evaluation of the BWARM program has resulted in four factors.

> (a) collaboration is one of the most cogent aspects of collaborative action research resulting in sharing of multiple perspectives and expertise; (b) communication enables teachers and researchers to continually and openly interact and engage in consensual dialogue about practice and research; (c) support for time, human and material resources, and opportunity are primary ingredients for educational improvement; and (d) recognition of teachers both by commendation and compensation is paramount to improvement. (p. 2)

Action research involves teachers as integral members of research teams engaged in classroom-based inquiry, as professionals in their classrooms, and reflects upon their own practice in order to improve the educational experiences of their students. In action research, teachers actively develop, implement, and evaluate new learning experiences for their students and observe their own teaching. Action research not only improves practice but also helps teachers' professional development and the professionalization of teaching. "A partnership, based on equality and shared responsibility between teachers on the one hand and scientists and engineers in university, business, and industry on the other, offers another route towards enhancing the professional status of teachers" (White & Klapper, 1993, p. 5). These projects suggest that when engaged as professionals and provided with support through established collaborations and resources, teachers will assume the role as professionals and as innovators and/or change agents. However, providing individual teachers with such support may not be enough to affect professionalization of teaching. An environment that treats and encourages teachers to be professionals is also essential for teacher professionalization.

An environment that promotes and sustains the professional teacher is called professional teaching environment. Teachers who teach in professional teaching environments can be agents of educational change. A professional teaching environment includes elements that help teachers grow professionally and that enhances the professional status of teachers (European Union, 2010).

Pre-Service Teachers' Perceptions of School Contexts

Many researchers have emphasized the importance of placing prospective teachers in different teaching contexts such as urban, suburban, and rural during their student teaching (Cook & Van Cleaf, 2000; Goodlad, 1990; Nelson, 1997). If we fail to prepare teachers by engaging them fully in fieldwork in diverse settings, we cannot expect them to take full professional responsibility. Beginning teachers' perceptions are important to consider for the improvement of a teacher preparation program (Goodlad, 1990).

Pre-service teachers' perceptions of urban, suburban, and rural teaching environments can be different due to different characteristics and resources of each setting. It is generally believed that prospective teachers hold a negative belief about the urban teaching environments (Anderson & Olsen, 2006; Garcia, 1994). Banks and Stave (1996) designed a qualitative study to investigate 12 pre-service teachers' views toward urban education during a two-week experience in an urban high school. Subjects' pre-experience perspectives showed positive shifts on the post-experience responses for both females and males. The attitudes of prospective teachers toward the teaching environment, community support, student characteristics, and other aspects of urban and non-urban schools were also investigated. Hynes and Socoski (1991) developed and administered a 98-item questionnaire to 140 students entering a teacher preparation program to assess the perceptions related to urban and non-urban schools. The purpose of the study was to seek answers to the question of whether or not undergraduates beginning a teacher education program perceived urban schools as being different from non-urban schools, and identify the differences of their perceptions, if any existed. The results suggested that most of the subjects thought that in urban schools students were likely to be under-prepared academically, would have poor attitudes toward school, were in need of discipline, and would have parents who do not support teachers. They also thought that a typical urban school building was in disrepair, located in an unsafe neighborhood, and was itself a dangerous place to be at. Kelly (1993) indicates that student teachers develop their understanding of teaching and learning enterprise during their field experiences and this development of the "real-world" perspective depends on their experiences in actual schools rather than their on-campus college classes. Results of a study by Harper, Weiser, and Armstrong (1990) indicated that teachers perceive the teacher preparation program as the most significant factor influencing teaching effectiveness. In addition, the study showed that support from the local community was an important factor as perceived by teachers in their teaching effectiveness.

Significance of the Present Study

Effective science teaching may be facilitated when teachers' expectations about their teaching environments are met. The educational needs of science and mathematics teachers can be related to the environment in which they teach; the technology they use; encouragement to do research on more effective

ways of teaching; and appreciation and continued support from families, school boards, and administrators. Research has suggested that attracting and retaining high-quality teachers in the teaching profession depends mostly on building teacher morale; reducing teacher stress; community, parents, and principals' support of teachers; recognition and nurturance of teachers as true professionals; appreciation and commendation of teachers' work (European Union, 2010; Loucks-Horsley et al., 2010); reducing their work loads; and empowering them to make their own choices about classroom decisions and managing their time (European Union, 2010; Loucks-Horsley et al., 2010).

This study was designed to identify the essential elements of a professional teaching environment as well as teachers' perceptions of the availability of these characteristics. There may be some features that are provided for teachers by the school administration, policy makers, and/or community but teachers may not perceive these features as important to their functioning. Identifying this can be an important finding because it may indicate a difference between teachers' and administrators' perceptions of important elements of a professional teaching environment or a lack of communication between teachers, school, principals, administrators, and community.

The situation can be reverse as well. In other words, things that are perceived as important characteristics of a professional teaching environment by teachers may not be perceived as important or equally important by the school principals, administrators, community, and parents and therefore, may not be provided to the teachers. Hence, this may lead to a lower quality teaching environment, lower morale for teachers, and lower student achievement. Elements that are perceived as important and available by teachers, the school administration, and the community alike can be determined as well as elements that are not perceived as important and available.

The findings of this study may be useful in terms of its contributions to the design and sequencing of teacher education field experiences since the results include pre-service teachers' perceptions related to different contexts and grade levels which in turn would help them select teaching positions with support systems conducive to a successful professional development. Therefore, this study may significantly contribute to the field of teacher professionalization and school improvement.

Rationale for the Study

Since the mid-1980s, there has been an emphasis on school improvement in the educational literature. Many researchers have investigated the effects of school climate on school improvement, teacher effectiveness, and student achievement (Paredes, 1993); principals' role in school climate (Pashiardis, 1998); teachers' perceptions of school climate and its effects on school outcomes (Hauck, 2012); professional growth of teachers and professionalism (Berlin, et al., 1995; Van Wessum, 1999); community and district support for teachers' professional development (Ross, 1990); and factors determining job satisfaction, high teacher morale, and motivation (Baylor & Ritchie, 2002; Brodinsky, 1984; European Union, 2010).

It is assumed that factors such as teacher expectations, school characteristics, school climate, time, incentives, and rewards make differences in school achievement (Dorman, Fraser, & Mcrobbie, 1997; Hoy & Woolfolk, 1993), which is measured mostly by competency examinations. The instrument for this study, the Professional Environment for Teaching Survey (PETS), is an instrument that assesses teachers' perceptions of their teaching environment. In order for recommended changes to be effective, places where teaching and learning take place should be designed according to teachers' needs and perceptions of what is important. To do this, their perceptions about characteristics of a professional teaching environment must be determined. By doing this, we can not only determine the strengths and weaknesses of our schools and school districts but also plan new programs and take precautions to provide teachers with professional teaching environments which will help them develop professionally and in turn lead to effective educational changes.

In order for teachers to do a professional job in schools, it should be assured that they have a professional environment for teaching. Students will not be served professionally if teachers are not able to act in "professional" ways in schools (European Union, 2010). Thus, it is significant for researchers to investigate these needs and find out what is perceived as important by teachers as characteristics of a professional teaching environment. Since professional development is a life-long process, professionalism must be addressed during teachers' pre-service years. The field experience component is a good place to work with pre-service teachers and determine their perceptions of the environments in which their field experiences take place. This is also important in terms of motivating them during their student teaching and helping them become proficient teachers.

Professional teachers are one of the most important elements of a successful educational reform. Their beliefs about reform recommendations and science teaching and learning environments are important and must be investigated thoroughly for these changes to be effective. This investigation is vital for the effectiveness and durability of science education reform

recommendations. Therefore, it would be an important study as well as a valuable contribution to the professional development literature and to the improvement of teacher education programs to determine any correlational/predictive relationships between the factors that grade 7-12 pre-service and/or in-service science, mathematics, and technology education teachers perceive as important for doing a professional job and their teaching experience, teaching assignment, area(s) of certification/licensure, school context, grade level, gender, and degree.

Purpose of the Study

The purpose of this study was to investigate science and mathematics pre-service and in-service teachers' perceptions of the importance and availability of certain aspects of a professional teaching environment. This study investigated the possible correlational/predictive relationships among the factors (a) public recognition, appreciation, and support of teachers, their capabilities, and responsibilities; (b) opportunities and resources to carry out the professional responsibilities of teaching; and (c) the teachers' experience, teaching assignment, area(s) of certification/licensure, school context and grade level, gender, and degree. This study also investigated the relationship of field experience context and grade level on pre-service teachers' perceptions of their professional teaching environment. It is important to determine what pre-service teachers know about their profession and the actual work environments where they will be teaching in the future. The results of this study would be useful to characterize the environmental conditions and support systems of science and mathematics teachers' work environments. The level of support, respect, and the incentives a community provides for science and mathematics teachers are also important aspects of professional development and were examined in this study. The study included science and mathematics teachers' responses related to their perceptions of importance and availability of certain aspects of the teaching environment. The purpose was to clarify the differences between perceived importance and perceived availability of different aspects of the teaching environment related to pre-service and in-service teacher professional development and work experiences. Regarding these aims, following research questions guided this study:

1) What characteristics of teachers and their teaching experience correlate with their perceptions of the importance of Resources for Teaching?
2) What characteristics of teachers and their teaching experience correlate with their perceptions of the importance of Recognition of Teacher Contributions?
3) What characteristics of teachers and their teaching experience correlate with their perceptions of the availability of Resources for Teaching?
4) What characteristics of teachers and their teaching experience correlate with their perceptions of the availability of Recognition of Teacher Contributions?

METHODOLOGY

Research design

This study is descriptive/correlational research seeking to identify correlational/predictive relationships between variables. Correlational studies are mainly exploratory. This type of research is useful in studies concerned with prediction and describing relationships (Ary, Jacobs, & Razavieh, 1996).

This study sought to investigate the relationships and/or correlations between teacher perceptions of importance and availability of certain aspects of a professional teaching environment with selected independent variables including school setting and grade level of teacher experiences. Dependent variables for this study are teacher perceptions of:

1) Importance of Resources for Teaching (IRT)
2) Importance of Recognition of Teacher Contributions (IRTC)
3) Availability of Resources for Teaching (ART)
4) Availability of Recognition of Teacher Contributions (ARTC)

Some independent variables can be considered as manipulated, but teachers were not randomly assigned to these conditions. These independent variables are: Field experience grade level (7-9 and 10-12), field experience context (urban [inner city] and suburban [outer city]). The grouping independent variables are: Degree (BA/BS, MA/MS, and PhD), Gender, Area(s) of certification/licensure of pre-service teachers, teaching assignment of in-service teachers (included variables: chemistry, EarthSci, BioLifeSci, GenerelSci, Math, Physics, and TechEd), teaching experience of in-service teachers at each grade level 6-12 and over all.

Sample

Sample of this study consisted of two groups, pre-service and in-service teachers. The sample was a convenience sample. It was chosen because of its availability. The limitation of convenience sampling is that, "there is no precise way of generalizing from a convenience sample to a population" (McMillan, 1996, p. 91). It was convenient for this study in that the primary purpose of this research was not to generalize "but to better understand relationships that may exist"

(McMillan, p. 91). One group in the sample was the pre-service teachers (n = 58) who were Master of Education (M.Ed.) students enrolled in a Mathematics, Science and Technology Education (MSAT) program of a large Midwestern university. There were two groups of pre-service teachers: the first group (n = 32) was surveyed in the spring 2002 and the second group (n = 26) was surveyed in the spring 2003. Both groups had completed a full year of field experiences. The other group in the sample was the in-service teachers (n = 37) who were mentor teachers in the public schools where the pre-service teachers' field experiences took place during the spring 2003 quarter. Although the pre-service and the in-service teacher samples included a small number of technology education teachers (n = 4), the focus of this study was on the science and mathematics teachers. The data were collected only from teachers; this study did not attempt to collect data from principals, parents, students or any other community representatives.

The MSAT M.Ed. program was developed and implemented in 1995 by the faculty representing mathematics, science, and technology education. The M.Ed. program requires four to five quarters of full-time enrollment, beginning in the summer and continuing through the following spring or summer. M.Ed. students are assigned to different schools and grade levels during three quarters of field experiences starting from autumn through spring. For instance, pre-service teachers who were assigned to an inner city (urban) school and to grade level 7-9 in autumn quarter would be assigned to a suburban area school and to grade level 10-12 in winter quarter. Pre-service teachers would be assigned to either an inner city (urban) or a suburban area school and to grade levels of 7-9 or 10-12 in the spring quarter for their final student teaching field placement. The purpose of these field experiences in different school settings is to prepare pre-service teachers to have professional skills and academic knowledge to be able to teach in different environments.

Instrumentation

The Professional Environment for Teaching Survey (PETS) was used for data collection. The PETS resulted from research projects on partnerships and action research conducted by the National Center for Science Teaching and Learning (NCSTL). This checklist consists of items generated from the analysis of qualitative and quantitative data gathered from teachers' written responses to open-ended questions and to formal and informal interview and debriefing sessions throughout the duration of two NCSTL projects (Berlin et al., 1996).

Each item from the PETS requires two responses. The first of these responses relates to the importance of the situation/condition described by the item as perceived by the respondent. The importance scale responses range from Very Important (3) to Not Important (1). The subjects are asked to respond by circling VI if the items describe conditions which they consider to be Very Important, MI if the items describe conditions which are perceived as Moderately Important and NI if the items describe conditions which are perceived as Not Important. The second category of responses relates to the availability of the situation/condition described by the item. The availability scale responses range from Generally Available (3) to Not Available (1). Subjects respond by circling GA if the items describe conditions which are Generally Available in their situation and accessible to them, LA if the items describe conditions which have Limited Availability in their situation and NA if the items describe situations which are Not Available to them. As a result of their responses, it is expected that subjects' perceptions of characteristics of a professional teaching environment can be determined. The PETS is presented in the appendix.

This instrument can be used as a way to characterize perceptions of a professional teaching environment and support system for science and mathematics teachers to function in a professional manner. It can also be used in a school system to determine the level of professional support for science and mathematics teachers and teaching that is provided by the school as perceived by school personnel. It can serve as an indicator of the level of support, respect, and incentives a community provides for science and mathematics teachers, effective teaching, and education in general.

Validity and Reliability of the PETS

The PETS has been pilot tested (Berlin et al., 1996) and data related to science teachers' (n = 59) perceptions of the importance of the situation/condition for a professional teaching environment were subjected to a principal component analysis with orthogonal rotation (Varimax) and three underlying constructs were found to describe professional teaching environment. Reliability analysis of the responses of 59 science teachers to the importance aspects of the PETS resulted in internal consistency reliability estimates of: alpha = 0.91 for all items combined, alpha = 0.86 for component one, alpha = 0.83 for component two, and alpha = 0.75 for component three (Berlin et al., 1996). Content validity in this study was verified by a thorough examination of the PETS by a panel of expert judges.

The PETS was also pilot tested with 32 science, mathematics, and technology education pre-service

teachers and the responses were subjected to a principal component analysis with an orthogonal Varimax rotation (Sahin, 2003). As a result of this analysis, three components, accounting for 40.6% of the variance, were identified. Data analysis of the responses of 32 pre-service teachers to the PETS resulted in internal consistency reliability estimates of: alpha = 0.87 for all items combined, an alpha = 0.83 for component one, an alpha = 0.82 for component two, and an alpha = 0.78 for component three.

In the present study, data were collected from science, mathematics, and technology education pre-service and in-service teachers. The data were subjected to a principal component analysis with an orthogonal Varimax rotation to obtain a sense of underlying constructs which describe the important aspects of a professional teaching environment as perceived by the teachers of this study. Two-component and three-component solutions were examined. The two-component solution was accepted because it more nearly represented a simple structure. As a result, two components, which together accounted for 34.3 % of the total variance, were identified.

The first component included 13 items and was named as Resources for Teaching (RT). The second component included 13 items and was named as Recognition of Teacher Contributions (RTC). Data analysis of the responses of teachers to the PETS resulted in an internal consistency reliability estimate of alpha = 0.91 for all items combined, an alpha = 0.84 for Resources for Teaching, and an alpha = 0.86 for Recognition of Teacher Contributions. Reliability analyses of only in-service and only pre-service teacher responses were also conducted. Overall, the reliability estimates ranged from 0.82 to 0.91. Table 1 summarizes all of the reliability estimate computations. The principal component and reliability analyses show that the PETS instrument produced similar results for different groups of teachers at different times.

Data Collection

In this study, data were collected from three groups; the two consisted of pre-service teachers and the third consisted of in-service teachers. The first part of the data were collected from pre-service teachers during the spring 2002 and spring 2003 quarters. This was an end-of-year data collection since by that time these pre-service teachers had gone through three consecutive quarters of field experiences during the autumn, winter, and spring quarters. Thirty-two pre-service teachers from the spring 2002 quarter and 26 pre-service teachers from 2003 spring quarter responded to the PETS. The second part of the data obtained from in-service teachers. In total, 37 in-service teachers participated in the study.

Data Analysis

Data were analyzed using SPSS version 12.0. Descriptive statistics including means and standard deviations were computed. Correlations and forward stepwise multiple regression analyses were computed. Approximately half of the pre-service teachers and 86% of the in-service teachers had a master's degree; 10% of both groups of teachers had taught or were licensed to teach earth science and 10% had taught or were licensed to teach physics. One third of the total sample had taught or was licensed to teach biology/life science, one third of the total sample had taught or were licensed to teach general science, and one third of the total sample had taught or was licensed to teach mathematics.

RESULTS

Descriptive statistics for the variables used in the correlational and multiple regression analyses of the responses obtained from spring 2002 pre-service teachers are shown in Table 2. The variable Sp02f represent the school context, inner city (urban) and outer city (suburban), where pre-service teachers were placed for field experiences during spring quarter. The variable Sp02gl represents the grade level with which pre-service teachers had experience during spring quarter. Two components obtained in the factor analysis yielded four dependent variables, two for the importance and two for the availability sections. They were named as, Importance of Resources for Teaching, Importance of Recognition of Teacher Contributions, Availability of Resources for Teaching, and Availability of Recognition of Teacher Contributions. The dependent variables were named slightly differently for

Table 1. Professional Environment for Teaching Survey (PETS) Importance Item Responses Internal Consistency Reliability (Cronbach's Alpha) Estimates for the Dependent Variables

	Pre-service		In-service		All subjects	
Variable (Component)	Alpha	n	Alpha	n	Alpha	n
Resources for Teaching	0.86	58	0.82	37	0.84	95
Recognition of Teacher Contributions	0.85	58	0.86	37	0.86	95
Overall Instrument	0.91	58	0.91	37	0.91	95

Table 2. Means and Standard Deviations of Descriptive Characteristics for the Spring 2002 Pre-Service Teachers

Variables	*M*	*SD*	*n*
IRTSp02	34.25	5.65	32
IRTCSp02	29.72	5.83	32
ARTSp02	27.41	5.37	32
ARTCSp02	23.47	4.90	32
Degree	1.56	0.50	32
Gender	1.44	0.50	32
BioLifeSci	0.38	0.49	32
Chem.	0.19	0.40	32
Earthsci	0.06	0.25	32
Gensci	0.53	0.51	32
Math	0.22	0.42	32
Physics	0.13	0.34	32
TechEd	0.03	0.18	32
Sp02f	1.28	0.46	32
Sp02gl	1.53	0.51	32

Note. Degree: PhD = 3, MS/MA = 2, BS/BA = 1.
Gender: Female = 1, Male = 2.
BioLifeSci, Chemistry, EarthSci, GeneralSci, Math, Physics, TechEd: 1 if to be licensed, 0 otherwise.
Sp02f: Spring 02 field experience context, suburban = 1, urban = 2.
Sp02gl: Spring 02 field experience grade level, 7-9 = 1, 10-12 = 2.

Table 3. Means and Standard Deviations of Descriptive Characteristics for the Spring 2003 Pre-Service Teachers

Variables	*M*	*SD*	*n*
IRTSp03	33.73	4.54	26
IRTCSp03	30.38	5.38	26
ARTSp03	30.88	3.64	26
ARTCSp03	28.19	4.99	26
Degree	1.15	0.37	26
Gender	1.73	0.45	26
BioLifeSci	0.31	0.47	26
Chem.	0.12	0.33	26
Earthsci	0.15	0.37	26
Gensci	0.08	0.27	26
Math	0.42	0.50	26
Physics	0.08	0.27	26
TechEd	0.04	0.20	26
Sp03f	1.08	0.27	26
Sp03gl	1.50	0.51	26

Note. Degree: PhD = 3, MS/MA = 2, BS/BA = 1.
Gender: Female = 1, Male = 2.
BioLifeSci, Chemistry, EarthSci, GeneralSci, Math, Physics, TechEd: 1 if to be licensed, 0 otherwise.
Sp03f: Spring 03 field experience context, suburban = 1, urban = 2.
Sp03gl: Spring 03 field experience grade level, 7-9 = 1, 10-12 = 2.

spring 02, spring 03, and in-service teachers. For instance, the dependent variables IRTSp02, IRTCSp02, ARTSp02, and ARTCSp02 represent the two principal components for the importance and availability scales respectively, that resulted from the principal component analyses of the responses of the whole sample. A listwise deletion process was used throughout the data analyses processes.

Descriptive statistics for the variables used in the correlational and multiple regression analyses of the responses obtained from spring 2003 pre-service teachers are shown in Table 3. The dependent variables IRTSp03, IRTCSp03, ARTSp03, and ARTCSp03 represent the two principal components scales, one for importance and one for availability respectively that resulted from the principal component analyses of the responses of the whole sample.

The final portion of the descriptive data is shown in Table 4 for the in-service teacher sample. There were 42 responses from in-service teachers but the analyses resulted in 37 usable data sources due to the listwise deletion process. The dependent variables IRTins, IRTCins, ARTins, and ARTCins represent the two principal component scales for importance and availability respectively that resulted from the principal component analyses of the responses of the in-service teachers.

The majority of the in-service teachers were located in suburban area schools. Only approximately 10% of the in-service teachers were teaching in urban area schools. This inequality of the representation of the different contexts may affect the perception of importance and availability results. All of these in-service teachers were females, two of them had a master degree and two had a Bachelor's degree. Overall teaching experience of these teachers ranged from 3 to

Table 4. Means and Standard Deviations of Descriptive Characteristics for the In-Service Teachers

Variables	*M*	*SD*	*n*
IRTins	35.78	3.15	37
IRTCins	29.22	4.96	37
ARTins	31.46	4.20	37
ARTCins	27.16	5.00	37
Degree	1.86	0.35	37
Gender	1.50	0.51	37
Chemistry	0.03	0.17	37
EarthSci	0.11	0.32	37
BioLifeSci	0.25	0.44	37
GeneralSci	0.25	0.44	37
Math	0.33	0.48	37
Physics	0.14	0.35	37
TechEd	0.08	0.28	37
SchCntxt	1.11	0.32	37
GradeLvl	1.64	0.49	37
TotExp	14.15	8.41	37
ExpGrd6	0.78	2.50	37
ExpGrd7	2.86	7.18	37
ExpGrd8	4.83	8.02	37
ExpGrd9	6.35	5.31	37
ExpGrd10	6.89	6.94	37
ExpGrd11	5.71	6.95	37
ExpGrd12	5.46	7.03	37

Note. Degree: PhD = 3, MS/MA = 2, BS/BA = 1.
Gender: Female = 1, Male = 2.
BioLifeSci, Chemistry, EarthSci, GeneralSci, Math, Physics, TechEd: 1 if licensed, 0 otherwise.
SchCntxt: School context, suburban = 1, urban = 2.
GradeLvl: Grade level, 7-9 = 1, 10-12 = 2.
TotExp: Total teaching experience in years.
ExpGrd6-ExpGrd12: Teaching experience at each grade level in years.

15 years. One of them was currently teaching mathematics in grades 9-12, one was teaching general science in grade 8, and two were assigned to grades 9-11 and were teaching biology. Approximately 24 in-service teachers were teaching grades 10-12 and 13 in-service teachers were assigned to grades 7-9. Of the 37 in-service teachers surveyed, only 3% were teaching chemistry, approximately 10% were teaching Earth science, and 14% were teaching physics.

Approximately 25% were teaching biology, life science, and general science. There were three technology education in-service teachers included in the study. Approximately half of the in-service teachers were male. The average total teaching experience for the in-service teachers was 14.6 years. The average teaching experience at different grades was also reported. Their teaching experiences ranged from an average of 1.6 years at grade 6 to 7.6 years at grade 10. The variables TotExp and ExpGrd6 through ExpGrd12 represents the total teaching experience (in years) and teaching experience at grades 6 through 12 respectively for the in-service teachers.

Correlations

The correlations presented in Table 5 include relationships between all pairs of variables for all pre-service and in-service teachers. The column for the spring 2002 group shows that IRT significantly correlates with IRTC ($r = 0.63$; $p < 0.001$), ART ($r = 0.59$; $p < 0.001$), and ARTC ($r = 0.35$; $p < 0.05$). Pre-service teachers who perceived RT as important in a professional teaching environment also perceived RTC as important. These pre-service teachers also considered that RT and RTC were available to them at the time of their field experiences. IRTC significantly correlated with degree ($r = -0.36$; $p < 0.05$) and math ($r = -0.37$; $p < 0.05$). Pre-service teachers with lower level graduate degrees perceived RTC as a more important part of a professional teaching environment than did those with advanced level graduate degrees. Also pre-service teachers who were to be licensed to teach mathematics considered RTC as less important than the others (i.e., science and technology education).

Table 5 shows the correlations between the spring 2003 pre-service teacher variables. IRT significantly correlated with IRTC ($r = 0.56$; $p < 0.005$); IRTC significantly correlated with ARTC ($r = 0.48$; $p < 0.05$) and Gensci ($r = 0.39$; $p < 0.05$). ART significantly correlated with ARTC ($r = 0.82$; $p < 0.001$). Pre-service teachers who perceived RT as an important part of a professional teaching environment considered RTC as important for a professional teaching environment. Pre-service teachers who perceived RTC as an important part of a professional teaching environment also considered RTC as more available to them than did pre-service teachers who perceived RTC as not important. Pre-service teachers who perceived RT as generally available during their field experiences in the spring 2003 quarter thought that RTC was also generally available. Spring quarter field experience grade level (Sp03gl) significantly correlated with IRT ($r = -0.53$; $p < 0.01$) and IRTC ($r = -0.47$; $p < 0.05$). Pre-service teachers who were placed in lower level grades (7-9) perceived RT and RTC as more important than did pre-service teachers who were placed in higher level grades.

Table 5 shows the correlations between in-service teacher variables. IRT significantly correlated with IRTC ($r = 0.67$; $p < 0.001$), ARTC ($r = 0.35$; $p < 0.05$), Degree ($r = 0.36$; $p < 0.05$), TotExp (total experience in years) ($r = 0.33$; $p < 0.05$), and ExpGrd8 (teaching experience in grade 8 in years) ($r = 0.34$; $p < 0.05$).

Table 5. Summary of Correlations between Dependent and Independent Variables for All Groups

Dept variable	Pre-service teachers		In-service teachers
	Correlations		
	Spring 02	Spring 03	
IRT	IRTC (+) ART (+) ARTC (+)	IRTC (+) Sp03gl (-)	IRTC (+) ARTC (+) Degree (+) ExpGrd8 (+) TotExp (+)
IRTC	Degree (-) Math (-)	ARTC (+) Gensci (+) Sp03gl (-)	ExpGrd7 (+) ExpGrd8 (+)
ART		ARTC (+)	ARTC (+) Gender (+) ExpGrd7 (+) ExpGrd8 (+) SchCntxt (-)
ARTC			ExpGrd7 (+) ExpGrd8 (+)

Table 6. Summary of the Significant Predictors of the Dependent Variables from the Regression Analyses by Group

Dept Variable	Pre-service Teachers		In-service Teachers
	Spring02	Spring 03	
Predictors			
IRT		Sp03gl (-) Gender (-)	Degree (+) ExpGrd8 (+)
IRTC	Math (-) Physics (-) Degree (-)	Sp03gl (-)	ExpGrd8 (+) Gensci (-)
ART			ExpGrd8 (+) Gender (+) TotExp (-)
ARTC			ExpGrd8 (+)

IRTC significantly correlated with ExpGrd7 ($r = 0.36$; $p < 0.05$) and ExpGrd8 ($r = 0.44$; $p < 0.01$). ART significantly correlated with ARTC ($r = 0.73$; $p < 0.001$), Gender ($r = 0.41$; $p < 0.05$), ExpGrd7 ($r = 0.38$; $p < 0.05$), and ExpGrd8 ($r = 0.45$; $p < 0.01$). ARTC significantly correlated with ExpGrd7 ($r = 0.37$; $p < 0.05$) and ExpGrd8 ($r = 0.43$; $p < 0.01$). In-service teachers' teaching context (SchCntxt) significantly correlated with ART ($r = -0.33$; $p < 0.05$). Teachers who perceived RT as important in the teaching environment also considered that RTC was important and available. These teachers had higher level graduate degrees, had more total teaching experience, and specifically had more teaching experience at grade 8. Teachers who had more teaching experience at grades 7 and 8 perceived RTC as more important and generally available; they also perceived RT as generally available in their teaching environment. Teachers who perceived RT as more available also perceived RTC as more available and they were more often males rather than females. Teachers who were teaching in urban area schools when the data were collected perceived RT as less available.

Multiple Regression Analyses

Multiple regression analyses were carried out for each group to determine the predictors of pre-service and in-service teachers' perceptions of IRT, IRTC, ART and ARTC. Only significant regression analyses are reported, analyses of non-significant regressions are not included. Results of multiple regression analyses for all groups are summarized in Table 6.

Spring 2002 Pre-service Teachers

Three variables Math, Physics, and Degree, were identified as significant predictors of spring 2002 pre-service teachers' perceptions of IRTC (See Table 6). The combination of these three variables accounted for 34% of the variance explained for the dependent variable IRTC. All three predictors had negative significant standardized regression coefficients, Math (*beta* = -0.32; $p < 0.05$), Physics (*beta* = -0.34; $p < 0.05$), and Degree (*beta* = -0.32; $p < 0.05$), indicating that pre-service teachers with majors other than mathematics and/or physics and those with lower-level degree status perceived RTC more important than the others. The regression model was significant ($F_{[3, 29]} = 5.26$; $p < 0.05$) and yielded an adjusted R^2 of 0.27.

Spring 2003 Pre-service Teachers

Two regression analyses resulted in the identification of significant predictors of the IRT and IRTC (See Table 6). Two variables, Sp03gl and Gender, were identified as the significant predictors of the spring 2003 pre-service teachers' perceptions of the IRT. The combination of these variables accounted for 38% of the variance explained for the dependent variable IRT. Both predictors had negative beta values, Sp03gl (*beta* = -0.49; $p < 0.05$) and Gender (*beta* = -0.34; $p < 0.05$), indicating that pre-service teachers who were placed at lower grade levels (7-9) during the spring 2003 field experiences and those who were females tended to perceive RT as more important than the pre-service male teachers at the 10-12 grade levels. The regression model was significant ($F_{[2, 24]} = 7.21$; $p < 0.05$) and yielded an adjusted R^2 of 0.32. The spring grade level placement, Sp03gl, was also identified as a significant predictor of the pre-service teachers' perceptions of the IRTC. It accounted for 23% of the variance explained for the dependent variable IRTC. A negative beta value (*beta* = -0.48; $p < 0.05$) was obtained, indicating that pre-service teachers who were placed at lower grade levels (7-9) during the spring 2003 field experiences perceived RTC as more important than those who were placed at

higher grade levels (10-12). The regression model was significant ($F_{[1, 25]} = 7.64$; $p < 0.05$) and yielded an adjusted R^2 of 0.20.

In-service Teachers

Four regression analyses, one for each dependent variable, resulted in determining significant predictors of the IRT, IRTC, ART, and ARTC (See Table 6). Two variables, Degree and ExpGrd8, were identified as the significant predictors of the in-service teachers' perceptions of the IRT. The combination of these variables accounted for 24% of the variance explained for the dependent variable. Both predictors had positive beta values, Degree (*beta* = 0.35; $p < 0.05$) and ExpGrd8 (*beta* = 0.33; $p < 0.05$), indicating that in-service teachers who had higher graduate degrees and those who had more teaching experience at grade 8, perceived RT as more important than those in-service teachers with lower graduate degrees and less experience at grade 8. The regression model was significant ($F_{[2, 35]} = 5.29$; $p < 0.05$) and yielded an adjusted R^2 of .19.

Two variables, ExpGrd8 and Gensci, were identified as the significant predictors of the in-service teachers' perceptions of the IRTC. The combination of these variables accounted for 33% of the variance explained for the dependent variable. A positive beta value, ExpGrd8 (*beta* = 0.52; $p < 0.05$) and a negative beta value, Gensci (*beta* = -0.37; $p < 0.05$) was obtained, indicating that in-service teachers who had more teaching experience at grade 8 and those who were teaching or licensed to teach subjects other than general science, perceived RTC as more important than in-service teachers with less experience and licensed to teach general science. The regression model was significant ($F_{[2, 35]} = 8.29$; $p < 0.05$) and yielded an adjusted R^2 of 0.29.

Three variables, ExpGrd8, Gender, and TotExp were identified as the significant predictors of the in-service teachers' perceptions of the ART. The combination of these variables accounted for 42% of the variance explained for the dependent variable. Two positive beta values, ExpGrd8 (*beta* = 0.76; $p < 0.05$) and Gender (*beta* = 0.35; $p < 0.05$) and one negative beta value TotExp (*beta* = -0.49; $p < 0.05$) were obtained, indicating that teachers who were males and had more teaching experience at grade 8, but less total teaching experience overall, tended to perceive RT as more available than more experienced female teachers with less experience at grade 8. The regression model was significant ($F_{[3, 34]} = 7.92$; $p < 0.05$) and yielded an adjusted R^2 of 0.37.

Variable, ExpGrd8 was identified as the significant predictor of the in-service teachers' perceptions of the ARTC. It accounted for 18% of the variance explained for the dependent variable. The predictor variable had a positive beta value, ExpGrd8 (*beta* = 0.43; $p < 0.05$), indicating that in-service teachers who had more teaching experience at grade 8 perceived RTC as more available than did teachers at other grade levels. The regression model was significant ($F_{[1, 36]} = 7.70$; $p < 0.05$) and yielded an adjusted R^2 of 0.16. A summary of all the predictors by pre-service and in-service teachers and by quarter is presented in Table 6.

DISCUSSION

In general, the correlations can be presented in terms of what they reveal about perceptions of the pre-service teachers from whom the data were collected at the end of the spring 2002 quarter:

a) Correlations between the two scales of the instrument, PETS, (importance and availability) were positive. That is, pre-service teachers who perceived RT and RTC as more important also considered that these were generally available to them during their field experiences.

b) There were negative and positive correlations between the importance scales of the PETS and, the degree and content area of pre-service teachers. Pre-service teachers who perceived RTC as more important in a professional teaching environment were mostly pre-service science and technology teachers rather than pre-service mathematics teachers and they tended to have lower level graduate degrees. These correlations may be due to a variety of reasons, such as pre-service teachers' background; conditions of the schools where they were placed during their field experiences; and their perception of what was more important and available during that time interval.

There are three significant results that the correlations between the spring 2003 pre-service teacher variables reveal:

a) Correlations between and across the two scales of the instrument (importance and availability) were positive. Pre-service teachers who perceived Resources for Teaching as more important considered that RTC was also important. Pre-service teachers who perceived RTC as more important also considered that this component was generally available to them during the spring 2003 quarter field experiences.

b) Spring 2003 quarter grade level negatively correlated with the importance scales of the instrument. During this quarter, pre-service teachers who were placed in grades 10-12 perceived RT and RTC as less important than did pre-service teachers who were placed in grades 7-9.

c) During this quarter, pre-service teachers who were to be licensed to teach general science perceived RTC as more important than did other pre-service teachers (i.e., mathematics and technology education).

Three important points were identified among the correlations between in-service teacher variables:

a) Correlations between and across the two scales of the instrument (importance and availability) were positive.

b) The in-service teachers who had more teaching experience at grades 7 and 8 perceived RTC as more important and they also perceived RT and RTC as more available than did in-service teachers with less or no experience at grades 7 and 8. The in-service teachers who had more total teaching experience and more teaching experience at grade 8 with higher graduate degrees perceived RT as more important than did in-service teachers with less experience and with lower graduate degrees.

c) Teachers who were teaching in urban area schools perceived RT as less available to them than teachers who were teaching in suburban area schools.

Based on these findings, the research questions are answered next.

Research Question One

1) What characteristics of teachers and their teaching experience correlate with their perceptions of the importance of RT?

In general, field placement grade level and gender appeared as significant correlates for pre-service teachers and, education and teaching experience appeared as significant correlates for in-service teachers for the importance of RT.

Research Question Two

2) What characteristics of teachers and their teaching experience correlate with their perceptions of the importance of RTC?

The pre-service teachers' education, content area/certification, school context and grade level were the best predictors of their perceptions of the importance of RTC. These predictors were content area and teaching experience at grade 8 for the in-service teachers.

In general, education, content area, and field experience context and grade level appeared as significant correlates for pre-service teachers and teaching experience and content area appeared as significant correlates for in-service teachers for the importance of RTC.

Research Question Three

3) What characteristics of teachers and their teaching experience correlate with their perceptions of the availability of RT?

Multiple regression analyses did not yield any teacher variables to predict their perceptions of availability of RT for the pre-service teachers. These results indicated that in general, gender, teaching experience, and school context appeared as significant correlates for in-service teachers for the availability of RT.

Research Question Four

4) What characteristics of teachers and their teaching experience correlate with their perceptions of the availability of RTC?

Teaching experience was determined to be the in-service teacher characteristic that best predicted their perceptions of the availability of RTC.

CONCLUSIONS

It can be argued that this study was successful in achieving its goals which were to identify any correlational/predictive relationships between perceptions of the professional environment for teaching, field/teaching experience, and teacher background variables. Significant results were found and reported regarding pre-service and in-service teachers' perceptions of importance and availability of Resources for Teaching and Recognition of Teacher Contributions. The conclusions drawn from the results of the data analyses follow next.

Context plays an important role in teachers' functioning as professionals. There were important findings of this study which indicated that school context was related to both pre-service and in-service teachers' perceptions of the availability of Resources for Teaching and pre-service teachers' perceptions of the importance and availability of Recognition of Teacher Contributions. In-service teachers who were in suburban area schools and males who were totally in suburban schools perceived Resources for Teaching as more available than teachers placed in urban area schools. This finding is most probably related to the availability of a professional teaching environment that includes appropriate resources (time, human, and material) for teachers. It may also be a result of an unbalanced distribution of pre-service and/or in-service teachers in suburban and urban area schools as well as an unbalanced distribution of male and female in-service teachers in the urban and suburban contexts. It may be concluded that the resources were perceived to be more available in the suburban area schools than they were in urban area schools. This finding may also be related to a negative bias that pre-service teachers may have for urban schools (Garcia, 1994; Hynes & Socoski, 1991). Banks and Stave (1996) listed some problems in urban schools as perceived by pre-service teachers. These

include: "inequities in funding, inefficient bureaucracy, deteriorating physical plants, security issues and, physical and emotional needs of student population, as well as support and development of an adequate teaching staff" (p. 3). Beside the lack of resources, urban schools may be avoided because pre-service teachers may feel inadequate to handle the problems of urban schools, "such as racial tensions and the potential for violent confrontations" (Cook & Van Cleaf, 2000, p. 166). However, as the findings of this study indicate, in-service teachers (primarily in suburban contexts) compared to pre-service teachers (in both urban and suburban contexts) perceive resources to be more available.

The findings indicate that teachers, some groups more so than others, perceive Resources for Teaching and Recognition of Teacher Contributions as an important part of a professional teaching environment. These findings support the research in the literature which suggests that attracting and retaining high-quality teachers into the teaching profession depends mostly on building teacher morale; reducing teacher stress; community, parents', and principals' support of teachers; recognition and nurturance of teachers as true professionals; appreciation and commendation of teachers' work (Loucks-Horsley et al., 2010); reducing their workloads; and empowering them to make their own choices about classroom decisions and managing their time (European Union, 2010; Loucks-Horsley et al., 2010). The factors expressed in these studies were mostly the items that constituted the two components of this study and were regarded as important by the participants. There was a close overlap between the factors that determine high teacher morale (Baylor & Ritchie, 2002; Brodinsky, 1984; European Union, 2010) and the items that were perceived as important by the participants of this study such as support available to the school; opportunities to collaborate and design, develop, and implement useful teaching ideas; an effective community support system; and public recognition and commendation of teachers. These reports support the results of the current study which indicates that teachers perceive Resources for Teaching and Recognition of Teacher Contributions as important parts of a professional teaching environment.

The main purpose of this study was to investigate teachers' perceptions of importance and availability of certain aspects of a professional teaching environment. The items from the PETS cover all of the findings drawn from the literature. Two components emerged from the principal component analysis of teacher responses to the PETS. One was related to resources for teaching and the other related to the recognition of teachers' work, in other words respecting and valuing their work. Incentives in the form of recognition, commendation, and funds for external use for teachers were also critical components that were perceived as important by some teachers. The present study included extrinsic reward items and tried to identify pre-service and in-service teachers' perceptions of importance and availability of these factors in their teaching environments.

All of the findings from this research indicate the importance of considering teachers and their perceptions of what is important for them in their work, if we were to expect quality teaching from them.

It is reasonable to think that any teacher, as an individual, may not be able to foster changes in a school system or district even if he/she is given the opportunity. In order to make systematic changes, teachers should work in collaboration in an environment, which is open to change, and be willing to try new techniques. School systems should provide teachers with an environment that includes the elements that are perceived as important by its teachers. In other words, schools should provide necessary conditions to facilitate and promote teachers' professional development.

LIMITATIONS AND DELIMITATIONS

One limitation for this study is that one cannot know for sure that pre-service teachers will have an informed perception of the environments where their field experiences take place. Pre-service teachers were surveyed at the end of spring quarter. At the end of the spring quarter, pre-service teachers would be completing their field experiences and, by that time, would have been involved in field experiences to some degree for about a full school year (9 months) in two or three different settings. Another limitation that might have been imposed on this study is the sample chosen. The sample for this study was a convenience sample. Only a small number of in-service teachers returned the completed instruments from the urban area schools. The limited representation of urban area in-service teachers may lead to differences in perceptions that may not be attributed to the school context.

A delimitation for this study is that the data were collected only from 7-12 science, mathematics, and technology education pre-service and in-service teachers. Although this study focuses on 7-12 science and mathematics teachers' perceptions, the same strategies may be useful to determine teachers' perceptions from other disciplines. Another delimitation was that the study focused on teacher perceptions only, no data were collected from principals, parents, or other community representatives.

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