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LİSANSÜSTÜ EĞİTİMİN YAŞAMBOYU ÖĞRENME BECERİLERİNE ETKİSİ: FEN BİLGİSİ ALANI ÖĞRETMENLERİ İLE DURUM ÇALIŞMASI*

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ÖZ

Çalışmanın amacı, Fen Bilgisi alanı öğretmenlerinin (ortaokullarda 6-7-8. sınıflarda Fen Bilgisi dersini okutan ve liselerde 9-10-11-12. sınıflarda Fizik, Kimya veya Biyoloji dersini okutan) lisansüstü eğitimlerinin yaşamboyu öğrenme becerilerini nasıl etkilediğine ilişkin algılarını belirlemektir. Betimsel bir metodoloji benimsenen bu makale, nitel durum çalışmasıdır. Çalışma, Kuzey Kıbrıs'ta bulunan üniversitelerin eğitim fakültelerinde lisansüstü eğitim yapan ve ortaokul ve/ya liselerde Fen Bilgisi alanında öğretmen olarak çalışan 11 öğretmenle yapılmıştır. Derinlemesine görüşmeler, bireysel görüşmeler ile ders-içi gözlemler yapılarak ve günlük tutularak çalışma yürütülmüştür. Veriler, kaydedilen görüşmelerden, tutulan günlüklerden ve ders-içi gözlem kayıtlarından içerik analizi yapılarak analiz edilmiştir. Araştırmanın sonucunda, Fen Bilgisi alanı öğretmenlerinin öğretim yeterliklerini geliştirdiği, öğretim programının geliştirilmesini sağladığı, öğrenme ve öğretim süreçlerini zenginleştiren yollar geliştirmelerini sağladığı, çeşitli eğitim-öğretim materyalleri geliştirmelerini sağladığı, çeşitli ölçüm ve değerlendirme yöntemleri uygulamalarını sağladığı, içerik, yöntem, ders içi-dışı olaylar ve süre üzerine geliştirilmiş organizasyon becerilerini geliştirdiği, sınıf içi-dışı araştırma ve akademik yayın becerilerini geliştirdiği bulunmuştur.

Anahtar Kelimeler: Durum çalışması, yaşamboyu öğrenme becerileri, lisansüstü eğitim, fen bilgisi alan öğretmeni

EFFECT OF POSTGRADUATE EDUCATION ON LIFELONG LEARNING SKILLS: CASE FROM TEACHERS OF SCIENCE

ABSTRACT

The current study aimed at describing the perceptions of teachers of Science (teachers teaching Science lessons at secondary schools grades from 6, 7 and 8, and teachers teaching Physics, Chemistry or Biology lessons grades from 9, 10, 11 and 12 at high schools) on how postgraduate education affects their lifelong-learning skills. As a qualitative case study, it adopted a descriptive methodology. The study concentrated on 11 postgraduate students studying at various universities at various departments of education faculties who are serving as teachers of Science at the same time at various secondary and/or high schools in North Cyprus. The in-depth interviews, interviews, actual-teaching-time observations and diary-keepings were conducted. Data were analyzed using content analysis from the transcribed interviews, from the diaries kept and from the observation checklists. The results maintained that postgraduate studies provided teachers of Science to improve their instructional competencies and teaching programme; enriched ways of their learning, provided them to develop various types of teaching and learning materials and to apply various types of measurements and evaluation methods for improving their skills on teaching and learning; improved organization and management skills on content, method, events and duration; and facilitated them to conduct researches and do publications.

Keywords: Case study, lifelong learning, postgraduate education, teacher of science

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1.INTRODUCTION

Lifelong learning is an expected personal and professional skill and competency for promoting and developing self at work. Lifelong-learning, as a desired outcome for graduates (Hammer, Chardon, Collins & Hart, 2012) is the modified expert skill, which has continuous change in its nature and has required certain advanced cognitive ability (Groff, 2010), which is used for providing particular improvement on the skills of the workforce (Lee & Morris, 2016). It includes abilities such as on problem solving, on working independently and in a team, on effective communication through all formats and all levels, on self-directing the learning and on professional development needs (Heinrich, Bhattacharya & Rayudu, 2007).

Similarly, lifelong learning covers domains such as self-consciousness, self-management, self-judgement, self-efficacy, self-motivation, as well as skills on researching, thinking critically and solving-problems (Hammer et al., 2012). Recent discussions on lifelong education have close relationship to human resources, professional work, entrepreneurship, and reforms in educational arena (Ng, 2013). Development of policies of lifelong learning both in Denmark and Portugal has shown that though there are shared elements in their policies; different historical traces in the educational systems of both European countries affect the education and development of lifelong learning policy (Rasmussen, 2014). Its nature is difficult, but human learning processes affect understanding struggles regarding better world conditions. Therefore, admitting the difficulties and promises the lifelong learning offers is the right step to be a lifelong learner (Gouthro, 2017). Emphasis in the organization of education and learning activities bear the idea that they are lifelong processes (Schuetze, 2006). Lifelong education learning covers broad educational policy goal (Field, 2001) and its nature, extent and significance are still under discussion (Edwards, Ranson & Strain, 2002). Lifelong learning brings tensions on personal satisfaction and well-being, on social cohesion and on being competitive economically in its nature (Pirrie & Thoutenhoofd, 2013). Although there are tensions brought in its nature, promoting lifelong-learning skills has gained much importance than recently especially from education and business sectors. Increased attention has been on developing theories on combining learning and motivational principles as well as cognition and affective principals where the person as an individual has been placed in the context (McCombs, 1991). Students are strongly advised to be lifelong learners in order to be active members of the learning community. Thus, Hammer et al., (2012) found that lifelong learning has been gaining value among the participants. Participants, who are characterized as the lifelong-learners, are aware and understand how they learn and how learning itself takes place, are motivated to learn, and manage feelings and resources explicitly. These characteristics give rise to academic achievement (Harpe & Radloff, 2000). Hulse and Hulme (2012) concluded that teachers as practitioners are required to inquiry because their enquiry strengthens facilitating to explain how to explore prominent professional identity and to assert agency in initial teachers. However, the practical application of lifelong learning skills in Singapore has challenged due to the academic preference rather than vocational preference socio-culturally, due to lack of effective culture requiring lifelong learning and due to pragmatic ideology conflicting with joy of learning and carrying out learning enthusiasm (Tan, 2017). In this sense, lifelong learning needs to be supported although it has both difficulties and promises due to historical and social-cultural circumstances and applications. Postgraduate education, an autonomous scholar's production process (Johnson, Alison & Green, 2000) and as part of lifelong learning involves personal transferrable skills in its content requiring fundamental rethinking and ability to initiate these skills independently (Kemp & Seagraves, 1995). Thus, a research on finding out whether employers demand for personal transferable skills from the graduates on marketing, general management, finance and human resource management arenas reveal that interpersonal skills are required skills desired in the abovementioned arenas (Bennett, 2002). Similarly, undergraduate studies promote some skills transferred to professional life and/or academic life whereas postgraduate education certainly promotes crucial skills for transferring the professional life of the teachers. Similarly, postgraduate education should distinguish between holders of PhD and/or MPhil from shorter degree holders because such research degrees (PhD and/or MPhil degrees) help holders to enrich their own skills (Cryer, 1998). Consequently, bringing research and teaching together require reconceptualising the higher education's role and re-negotiating relationships between teachers and students (Brew, 2003).

On the other hand, one of the most prominent disadvantages experienced regarding lifelong learning is on the desire to participate to the lifelong learning activities. Some adults refuse to participate to the lifelong learning activities. Boeren (2017a) advised relevant and clear new models at the micro, meso and macro levels to the individual adults, education and training providers as well as nations' social education politicians because as part of lifelong learning, postgraduate studies aim at improving graduate learners' understandings and particular abilities required for lifelong learning in their work life (Endedijk, Vermunt, Meijer & Brekelmans, 2014). Similarly, some new integrative theories and recent methodological approaches for working with interdisciplinary teams on interdisciplinary projects are seen as the best solutions to solve undesired participants to join the lifelong learning activities. Such kind of integrative theories and methodological approaches include integrating each team member's disciplinary background, integrating various insights from various disciplines and combining governmental political decisions with multilevel models as well as integrating quantitative and qualitative research

methods to conduct research projects with the teams (Boeren, 2017b). Although there are pros and cons of lifelong learning, it should get enough attention from the educational policies to promote essential skills of the employees and/or teachers.

1.1. Purpose and Research Questions

As part of lifelong learning, postgraduate studies facilitate teachers to develop themselves personally and professionally especially in their practical teaching. In this sense, teachers of Science (teachers teaching Science lessons at secondary schools grades from 6, 7 and 8, and teachers teaching Physics, Chemistry or Biology lessons grades from 9, 10, 11 and 12 at high schools) carrying out their postgraduate studies are expected to have the upmost benefit from their studies in terms of promoting and developing themselves at work. This is due to the need that developing and promoting skills and competencies at work are vital in learning and teaching performance while carrying out their responsibilities while teaching Science as well as in adapting their general and particular knowledge, skills and competencies while promoting at new tasks in Science teaching. More highly educated and skilled teaching performance by the Science teaching staff, more contribution to a more advanced and competitive Science learning and teaching in terms of teachers and students. Therefore, the current research has sought answers to the following research question:

1- What do the teachers teaching Science report about how postgraduate education affects their lifelong-learning skills?

1.2. Significance of the Study

Postgraduate studies promote teachers' lifelong learning personally and professionally. These studies facilitate teachers' practical learning and teaching. In this sense, it is important for teachers of Science carrying out their postgraduate studies to have upmost benefit in order to promote their learning and their teaching. Additionally, such kind of study is the initial study carried out in North Cyprus' secondary and high schools and it may facilitate to upgrade the curriculum of postgraduate studies for teachers of Science. Therefore, it is important to identify how postgraduate studies affect lifelong skills of teachers of Science.

2. METHODOLOGY OF RESEARCH

2.1. Research Design

Since the current research sought to describe the perceptions of teachers on how postgraduate education affect their lifelong-learning skills in the real-life context, it adopted a descriptive methodology. Additionally, case study was used as the research design under qualitative paradigm. The current case study discusses an embedded research design study from the teachers of Science network in Northern Cyprus. The teachers of Science network kept their diaries and were in-depth interviewed, interviewed as well as observed. This network's perceptions were described throughout the study to find out how postgraduate education affect their lifelong-learning skills in the real context in pursuing an embedded research design (Yin, 2009).

2.2. Participants

Purposive sampling was applied in selecting the participants to ensure that key participants, who were selected, appropriate to the case. The key participants of the current study were teachers of Science teaching in secondary and/or higher schools in both private and state schools in Northern Cyprus. There were only eleven teachers teaching Science and carrying out their postgraduate studies at the same time. Among them, nine of the teachers of Science have been enrolling their postgraduate studies on Educational Sciences Departments- at the field of Educational Administration- and two of them have been enrolling their postgraduate studies at the field of Science teaching (one of them at the elementary school Science teaching department and the other at the secondary school Science teaching department, at the Biology education section). While using purposive sampling, humans are considered as the necessity to be used as informants and methods are used for choosing the most practical and effective participants for the studies (Dolores and Tongco, 2006).

2.3. Synthesis of data and trustworthiness

Trustworthiness of the current study has been based on four criteria, which are called truth-value, applicability, consistency and neutrality (Guba, 1981). Thompson (2004) and Palmquist (2006) suggested that truth-value is such kind of process involving review of peers. In this regard, educational experts in the field reviewed the interview questions and data each time. Ambiguous and uncertain questions reworded and reorganized. Gordon and Schontz (1990) asserted the reflexivity concept, which meant that researcher's potential influence throughout

the study (Thompson, 2004). Bryar (2000) revealed that case studies in nature admit the presence of the researcher in the process of the study. The researcher of the current research has frequent contact with the participants of the study. Triangulation was supplied for the enhancing credibility of the data sources (Krefting 1991; Tellis 1997; Thompson 2004). Multiple sources of data collection were applied in the current study. These multiple sources were Interviews with the teachers of Science, Diaries kept by the teachers and Observations by the researcher. Truth-value has been enhanced by the use of triangulation (Thompson, 2004) by carrying out interviews, keeping diaries and completing observations regarding the case, which is investigated in this study. The next criterion is on the applicability (Lincoln & Guba, 1985) of the findings (Krefting, 1991). Studying with small number of participants affect the applicability and trustworthiness of the study. Applicability of the current study was supplied through accessing to nearly all of the teachers of Science, who are conducting their postgraduate studies. Studying with nearly all of the participants appropriate to the case resulted in exploring the facts, rather than the circumstances (Palmquist, 2006) and increased the representativeness level of the results (Platt, 1988). The next criterion is the level of being replicable or consistency or dependability of the results (Krefting, 1991; Guba, 1981). Audit trail usage in the current study ensured the accurate collection of data, which increased the level of replicability or consistency or dependability of the results (Guba, 1981; Koch, 1994). The final criterion of the trustworthiness is the neutrality. The budget of the current study was very low and the study was less-time consuming compared to the studies with very large number of sample sizes, which supplied incredibility or neutrality of the study (Yin, 1994).

2.4. Procedures and Data Collection

Qualitative case study as a methodology has been used in the current research. The in-depth interviews (see Appendix 1 for the In-Depth Interview Form below) were conducted with 11 postgraduate students. Each participant was interviewed for more than two hours in order to identify the perceptions of them regarding what they thought about situations and to construct the reality about the case. They were asked to describe their perceptions on the effect of postgraduate education on lifelong learning skills of them in terms of their professional productivity and in terms of the process planning. Similarly, the participants kept diaries on how they were affected by the postgraduate study they were having in their actual teaching atmospheres. On the other hand, the researcher observed the participants' actual teaching sessions for two teaching hours per each participant and kept observation checklists (see Appendix 2 for the Observation Checklist below) to observe whether each teacher's actual teaching sessions represented what they claimed about the case while their interviewing sessions and in their diaries. The researcher also carried out at least 15 minute-discussions with each teacher after each observation session to make sure that the observation checklist notes represented teacher's own deliberate actual teaching aim, to avoid confusions and researcher's biases.

2.5. Data Analysis

Data were analyzed using content analysis from the transcribed interviews, from the diaries kept and from the observation checklists. While analyzing the data, four stages were applied. In the initial stage, for provisional coding and comprehending the data, a theme-starting list was created basing upon the research question in order to manage data. Broader themes were imported from the data linked to the primary research question. The broader themes were distinguished as *working in teams*; *leadership;* and *project management*. These broad themes facilitated identifying general perspectives in which themes were elaborated from general to particular instances (Miles & Huberman, 1994). Next the data were synthesized, organized and coded using patterns (Miles & Huberman, 1994). In the study, the descriptive themes were imported in which participants' perceptions were reflected. A new theme was appeared as *problem solving*. Previously coded data were re-coded to make sure there were not any missed codes. An identified new theme was reorganized as *working in teams and problem solving*. Third stage was on examining the relationships between identified categories of data (Tesch, 1990). In the current study, the data provided an easy interpreted and understood description of the perceptions of the participants. In other words, the themes were arranged under the main dimension *Lifelong-learning skills on postgraduate education to teachers*. The main themes were arranged under five main sub-themes, named *Improvement on the capacity of teaching skills* and *Improvement on the capacity of learning skills* under the theme identified as *working in teams and problem solving*. Next, the sub-themes *Improvement on organization skills* and *Improvement on management skills* under the theme identified as *leadership.* Last, the sub-theme on *Improvement on lifelong professional productivity* under the theme identified as *project management*. The main sub-themes were identified under each theme to make sure that the statements uttered about the data could be followed and found in the data. The final data analysis stage covered the proposition setting may be appropriate to settings and population (Ayres, Kavanaugh & Knafl, 2003; Morse, 1994). In the current study, the final stage involved the development of categories as propositions. In the current study, categories were identified as *instructional competencies, teaching programs* under the sub-theme called *Improvement on the capacity of teaching skills.* Categories on *instructional environments, lifelong-learning, change, material development and (alternative) measurement and evaluation*

were identified under the sub-theme called *improvement on the capacity of learning skills.* Similarly, the categories on *content* and *method* were identified under the sub-theme called *Improvement on the organization skills*. On the other hand, categories on *events and duration* were identified under the sub-theme called *improvement on management skills*. Last, the categories on *research skills* and *publication skills* were identified under the sub-theme called *lifelong professional productivity.* Participants' justifications were also identified as basis of the data in order to show how the themes, sub-themes and categories were maintained.

3. FINDINGS, DISCUSSION and RESULTS

The findings of the research were presented under a dimension followed by emerging themes, sub-themes, categories and the justifications based on the each emerging theme. This section attempted to answer the research question on what the teachers report about how postgraduate education affects their lifelong-learning skills (see Table 1 for the themes, sub-themes and categories emerged for the current study and the frequencies of each theme).

Table 1: Themes, Sub-themes and Categories of the Dimension Called Lifelong-learning Skills on Postgraduate Education to Teachers of Science and Frequencies of Each Theme

Themes	Sub-themes	Categories	f
1. Working in teams and problem solving	a. Improvement on the capacity of teaching skills	i. Lifelong-learning skill on the development of instructional competencies ii. Lifelong-learning skill on the improvement of teaching programs.	32
	b. Improvement on the capacity of learning skills	i. Lifelong-learning skill on the enrichment of instructional environments ii. Lifelong-learning skill on providing students with lifelong-learning iii. Lifelong-learning skill on the change in education and effective teaching iv. Lifelong-learning skill on material development v. Lifelong-learning skill on (alternative) measurement and evaluation	46
2. Leadership	a. Improvement on organization skills	i. Lifelong-learning skill on content ii. Lifelong-learning skill on method	33
	b. Improvement on management skills	i. Lifelong-learning skill on events ii. Lifelong-learning skill on duration	30
3. Project Management	Improvement on lifelong professional productivity	i. Lifelong-learning skill on research skills ii. Lifelong-learning skill on publication skills	36

3.1. Dimension: Lifelong-learning skills on postgraduate education to teachers

Lifelong-learning skills of postgraduate teachers were identified in this section. Among the dimension, three themes, five sub-themes and twelve categories were identified. Each theme was presented with the justifications emerged as the issues based on these emerged themes.

Theme 1: Working in themes and problem solving. The theme on *working in teams and problem solving* gave rise to the sub-themes on *improvement on the capacity of teaching skills* and *Improvement on the capacity of learning skills.* The categories imported from the inial sub-theme were *Lifelong-learning skill on the development of instructional competencies* and *Lifelong-learning skill on the improvement of teaching programs*. The categories imported from the next sub-theme were *Lifelong-learning skill on the enrichment of instructional environments*; *Lifelong-learning skill on providing students with lifelong-learning; Lifelong-learning skill on the change in education and effective teaching*; *Lifelong-learning skill on material development*; and *Lifelong-learning skill on (alternative) measurement and evaluation*.

Nearly all of the participants believed that the issues regarding *Lifelong-learning skill on the development of instructional competencies* base from *improved experiential teaching* and *improved teaching skills*. Some of the qualitative descriptions taken from the interviews regarding *Lifelong-learning skill on the development of instructional competencies* are presented below.

Teacher of Science 10 (ST10) said that:

> *I should admit that postgraduate study I am enrolled has been developing instructional competency I am having. I was graduated from university a while ago and started postgraduate study this year. I am happy enrolling postgraduate study because postgraduate study: i. deepens my ability and experience in teaching,*

> *and problem solving; ii. Enable me to promote and advance myself in my subject field: iii. Equip me with exegetical skills, I feel that I can explain critically and interpret scientific texts and/or journal articles very easily; iv. Equip myself to think and perform skilfully as a Science teacher... (ST10)*

Similarly, ST4 agreed that:

> *Postgraduate courses have focussed on the acquisition of the knowledge and skills necessary for comprehending Science teaching processes, learning theory/ies, teaching and learning processes applying both in the classroom and outside the classroom. I have been improving my teaching competencies, problem solving skills and my skill on material development a lot (ST4).*

More than half of the participants agreed that the issues regarding *Lifelong-learning skill on the improvement of teaching programs* base from *improved recent approaches*, *improved recent methods* and *improved recent techniques.* Some of the qualitative descriptions of teachers of Science on *Lifelong-learning skill on the improvement of teaching program* are as presented below. ST3 believed that:

> *…I think teaching program of the Science can be improved using alternative measurement and evaluation approaches, using recent technological tools, integrating technology into class teaching, applying innovative teaching approaches, methods and techniques, and adding skills on improving students' scientific, innovative and entrepreneurial thinking (ST3).*

In a similar way, ST6 admitted that:

> *In my postgraduate class, I have been learning to further sharpen my ability to train my students effectively, identify and solve problems effectively using the most recent tools and techniques (ST6).*

On the other hand, more than half of the participants revealed that the issues regarding *Lifelong-learning skill on the enrichment of instructional environments* base from *improved theory* and *improved practise*. Below are the qualitative descriptions of teachers of Science on *Lifelong-learning skill on the enrichment of instructional environments.* Hence, ST5 said that:

> *As a postgraduate student and a Science teacher, I gain understanding of theoretical and practical application to the teaching of students in the changing higher teaching environment. I have been learning how to engage with my students in blended-teaching contexts and face-to-face contexts. I can organize creative and fruitful instructional environments for my students after enrolling postgraduate classes…. I can also see and solve problems at the time they appear (ST5).*

ST8 revealed that:

> *Postgraduate Science teachers explore the most recent and suitable teaching models for classroom usage in the teaching and learning environment. I was not familiar with the technological tools and blended learning techniques necessary for Science teaching before attending the postgraduate classes (ST8).*

In addition to this, nearly all of the participants agreed that the issues regarding *Lifelong-learning skill on providing students with lifelong-learning* base from *increased reflection* and *increased professionalism*. A qualitative description by ST6 on *Lifelong-learning skill on providing students with lifelong-learning* is as follows:

> *Postgraduate study I am enrolling contributes to my professional learning and let me improve myself on teaching creatively. Actually, I teach my students to fish; I do not feed them with fish. In other words, I do not spoon-feed them…. They produce their materials for example. They present me what they have learned from the experiment they conduct in the lab session and put the posters around. I only explain the topic and guide them, and they play a big role in their learning. I think, I contribute a lot in their lifelong-learning and their problem solving skills as well. And, I must say that they contribute to my professional learning and my problem solving skills as well. Contributing to their lifelong-learning makes me feel good because my students will never forget what they do in my classes. They are very creative (ST6).*

At the same time, nearly all of the participants revealed that the issues regarding *Lifelong-learning skill on the change in education and effective teaching* base from *improved creativity and team-work* and *increased systematic inquiry.* Some qualitative data from teachers of Science regarding *Lifelong-learning skill on the change in education and effective teaching* are presented below. ST4 admitted that:

> *Researches I conduct in my own classes contributed a lot to my teaching, to my students' learning and to effective and creative learning environments. Postgraduate study let me think systematically, develop systematic inquiry, identify problems and solve them immediately, develop my competency in research design, methodology and so on (ST4).*

Similarly, ST8 emphasized that:

> *At the moment I am preparing a research paper to a conference. I observed, asked my students keep diaries and asked my colleagues to observe my teaching of a topic using two different methods. It was a mixed method research. It was a great experience for me to work with my students and my colleagues intensively. I promised myself to continue conducting more researches in my classes, because I feel that this research experience has contributed my professional learning in terms of being aware the need to change, work together as a team and teaching effectively a lot (ST8).*

On the other hand, nearly all of the participants agreed that the issues regarding *Lifelong-learning skill on material development* base from *improved authenticity* and *improved quality*. A qualitative description of ST5 regarding *Lifelong-learning skill on material development* is presented as follows:

> *Postgraduate study I have been enrolling has contributed me in terms of materials development…. I was offered recent knowledge how I can create originally produced materials for my teaching contexts. I have gained some professional theoretical and practical skills throughout my postgraduate study. Before registering to the postgraduate study, I was not using creative, enjoyable and fruitful materials while teaching. Actually, I was a slave of the books and made my students to be slaves of the book they need to study. Now, I am full of knowledge and energy to produce kinds of materials to strengthen my students' learning skill and support their learning. Both my students and I are not slaves of Science books; we produce mutually which contributes our learning a lot. Being a slave of the books was a problem; I sorted out this problem and started using my creativity throughout the lessons (ST5).*

Similarly, nearly all of the participants revealed that the issues regarding *Lifelong-learning skill on (alternative) measurement and evaluation* base from *decreased dependability* and *increased mutual pleasure*. Below it is presented some qualitative data from teachers of Science on *Lifelong-learning on (alternative) measurement and evaluation* below. ST2 discussed that:

> *… my students are eager to learn more, demand to be active in Science classes a lot. I teach them how and why they need to learn, where to find the necessary tools to learn. They prepare some of the materials for the class time. Before I start postgraduate, I was not thinking creatively; I did not let my students prepare something for the lessons; I was spoon-feeding them. Now, I feel that I can contribute to lifelong-learning of the students, I mean providing them how to fish, is one of main objectives. I do not spoon-feed them now. I just show them how to do and why to do. They are really active in the class teaching hours and our lab hours. They take notes, prepare some 2-3 minute presentations on what they have found/learned regarding the topic and prepare their portfolios. When I examine their portfolios, I can see lots of creative ideas regarding the topics and/or the lab experiments we do. They produce lots of posters, and collect samples around them. Actually they are familiar with every material we can use in the class and in the lab. The relationship of making my students to be innovative and fruitful to enrolling my postgraduate study is positive and high (ST2).*

On the other hand, ST11 admitted that:

> *Before starting my postgraduate study, I was testing my students with classical examinations. A mid-term and a final exams asking what and why based questions…. After starting postgraduate study, I have started using alternative measurement and evaluation techniques. Last term, I asked my students to prepare portfolios, evaluate their classmates and themselves, prepare posters, write their own stories using scientific terminology, establish terminology association and so on. Using both classical and alternative measurement and evaluation techniques has made my classes more enjoyable for myself and for my students (ST11).*

Lifelong-learning contributes to intensive learning of the learners, which promotes extended learning. Thus, lifelong-learning and deep approach to learning has positive relationship whereas surface approach has negative relationship with lifelong-learning (Kirby, Knapper, Lamon & Egnatoff, 2010). Enrolling at postgraduate studies contributes to the teaching skills of teachers in terms of improving the instructional competence, teaching programme, instructional environment, material development, measurement and evaluation, as well as changing education and learning how to learn. It improves their teaching practice and gives ways to find out recent strategies to enhance their teaching and researching skills (Ion & Iucu, 2016). Wieser (2016) proposed patterns on how teaching and educational knowledge are related to each other, called evidence, life-history and practice-theory patterns, which cover practical and personal educational knowledge. These two modes of knowledge link practice and theory through demand teachers to comprehend how to transform their knowledge to their teaching contexts (Wieser, 2016). Similarly, developing the qualifications, planning the current and future careers, maintaining interest, changing profiles of learners, improving professional and social networks are the categories of motives for teachers enrolling at postgraduate studies (Ho, Kember & Hong, 2012).

Theme 2: Leadership. The theme *leadership* generated sub-themes called *improvement on organization skills* and *Improvement on management skills.* The initial theme yielded sub-themes on *Lifelong-learning skill on content* and *Lifelong-learning skill on method.* The next theme generated sub-themes on *Lifelong-learning skill on events;* and *Lifelong-learning skill on duration.*

Nearly all of the participants revealed that the issues regarding *Lifelong-learning skill on content* base from *improved responsibility* and *shared leadership*. A qualitative description of ST10 on *Lifelong skill on content* is as follows:

> *…Not only me, but also my students are leaders in my classes. They love learning. My general aim is to improve my students' learning capacity and make them be responsible of their learning in terms of content. This contributes me developing my skills regarding organization in the class and in the lab teaching sessions. I always believe that I should not be the only leader during the lessons, but my students should also be leading their learning (ST10).*

Similarly, ST3 advocated that:

> *…This is the issue for me to feel myself as the leader of my teaching and my students as the leader of their learning. There is a mutual leadership benefit. Not only me but also my students are both leaders of my teaching hours (ST3).*

The participants also agreed that the issues regarding *Lifelong-learning skill on method* base from *improved classroom management* and *improved motivation*. ST11's description on *Lifelong skill on method* is presented below:

> *Recent teaching methods, which I realised due to my postgraduate study, help me improve my organization skills in the class and in the lab. Applying the most recent and most appropriate methods to the topics get attention of the students. I do not suffer from any student's distraction. I hear my colleagues complaining about the distracted students in some classes, but I do not have such kind of problem, because most recent and most appropriate methods are really motivational for the students. This makes me to be well-organized throughout the academic year (ST11).*

Similarly, nearly all of the participants agreed that the issues regarding *Lifelong-learning skill on events* base from *improved joy* and *eagerness in learning.* Thus, ST1's description on *Lifelong skill on events* is as follows:

> *I can easily plan my lessons; organize a fruitful learning environment and events. I feel very relaxed in the class and in the lab because my students are eager to learn from the event I create, content I organize, method I use, duration I arrange. I owe this to my postgraduate study program I enrol. Before I start to my postgraduate study, I was spoon-feeding the students. Postgraduate study program has contributed my students and me to be happy mutually (ST1).*

On the other hand, nearly all of the participants said that the issues regarding *Lifelong-learning skill on duration* base from *enriched lesson time* and *improved organization*. A qualitative description of ST9 on *Lifelong skill on duration* is presented as follows:

> *…Looking at the befores and afters of the postgraduate study, I was thinking that I should be the boss of my classes before. But, now I think my students and myself are leaders of our teaching and learning processes. With my postgraduate study, I have improved myself in organizing the content and duration of the topics. Organization of the duration helps me to organize some field-based lessons for example. Field based lessons such as examining insects and beetles or type of the land… like this…. Before my postgraduate study, I was not even interested in taking my students to the field. I am glad to be a postgraduate student (ST9).*

Postgraduate studies have positive contribution to renew the organization skills of the teachers. Teachers' developing understanding and innovativeness on the factors affecting the development are considered to be the changing factors in understanding the teaching (Wood, 2000). Attending to a one-year development program on content knowledge and Science education (based on understanding of nature of Science), teachers agreed that their understanding of nature of Science has been showed improvement (Cofré et al., 2014). Therefore, professional development programs of teachers regarding the content knowledge and understanding the nature of the lessons would be beneficial.

Theme 3: Project management. The theme on *project management* gave rise to a theme named *improvement on lifelong professional productivity*. The sub-themes imported from this theme were *Lifelong-learning skill on research skills*; and *Lifelong-learning skill on publication skills*.

Nearly all of the participants agreed that the issues regarding *Lifelong-learning skill on research skills* base from *increased productivity* and *increased practicality.* Some qualitative descriptions from teachers of Science regarding *Lifelong-learning skill on research skills* are presented below. ST2 emphasized that:

> *I am a postgraduate student and a Science teacher. Upon completing my postgraduate study, I will gain the* ability *to think and execute skilfully as a researcher practitioner. This vital competency I will gain focus on the development of research skills necessary to enrol my postgraduate study, to enrol research in my class, on my students to see how to develop myself further regarding my class teaching, my students, my students' families, my school, my colleagues, and so on (ST2).*

On the same time, ST9 claimed that:

> *Postgraduate study I am enrolling has contributed a lot to my research and publication skills I have got two publications. I am happy to feel that I can conduct researches and publish my products. I produce the research and the article itself. I feel really good and confidence with that (ST9).*

Similarly, participants all revealed that the issues regarding *Lifelong-learning skill on publication skills* base from *increased qualifications* and *increased competencies*. ST7's qualitative descriptions on *Lifelong-learning skill on publication skills* is as follows:

> *I took some research-based courses throughout my postgraduate studies. I am writing my dissertation nowadays and teaching at a private school at the same time. This process makes me go beyond the development of both the essential knowledge and thinking skills required to carry out the research process and publication process. My own class is the place where I can study practically; conduct research studies. It is my practical study place. I can identify a research problem, conduct a literature review, design a research approach, conduct the research and write a report my postgraduate study purposes and/or for publication purposes. I consider this as freedom of my class-students, my school and myself (ST7).*

Teachers enrolling at postgraduate studies revealed that there is a positive relationship between the research conducted and teachers' teaching area at school. Researches conducted throughout the postgraduate studies of teachers at university improve the teachers' teaching practice (Ion & Iucu, 2016). Thus, the influential concepts describing what teachers' produce while enrolling at postgraduate studies are based on a connection of research and teaching such as connecting, linking, engaging, informing, intensifying, basing, inquiring both teaching and research (Dekker & Wolff, 2016; Zamorski, 2002) for investigating the relationship between research based activities and teaching based activities. Thus, research based programs are tended to be chosen since learning should be in research mode, not among entirely solved problems (Healy & Jenkins, 2009). Such kind of programs intertwining research and teaching facilitate teachers to be active in theory and practice simultaneously.

Similarly, conducting research throughout the postgraduate education has contributed to somewhat dispersed knowledge (Rudd, 1984). This would have positive impact on teacher's way of looking. The more dispersed knowledge means to have wider view of point of the teachers. A study whether comments on researching activity on learning of the students have positive or negative effect among lecturers, concluded that the more frequency of having positive comments the more qualified and quality on research activities in their disciplines (Lindsay, Breen & Jenkins, 2002). Similarly, a model based on the notion of academic-society's practice is required to enhance the relationship between teaching activity and research activity (Brew, 2003). Therefore, upon graduating, teachers enrolling at postgraduate studies will be among the academic society. Framing a model through including teachers studied postgraduate can be part of the model intensifying and improving the quality of research and teaching.

Lifelong education is considered as the strategy for surviving which also improves employability for a country. It is one of the essential human rights to develop professionally and get power, which facilitates employability and opens doors to get higher salaries. It is a useful strategy in reducing gaps among people's incomes and increasing social advantages regarding higher productivity and social capital. It also improves teachers' content-based, method-based, duration-based and events-based organization skills. The more lifelong learners the more eclectic approaches in its nature (Ng, 2013). In this sense, lifelong education should be supported among universities. Universities require simplifications among the transition between vocational and academic courses (Müller et al., 2015). However, directing students to promote their own professional learning is considered positive, but promoting postgraduate professional learning programs, which are aiming at raising self-regulated lifelong learners is not the only adequate circumstance to increase students' understanding and particular abilities (Endedijk et al., 2014). Similarly, perceptions of postgraduate learners regarding approaches and interpretations they make use of while assessing the students' written assignments gave rise to revisions in the curriculum and brought much transparency to the assessment processes (Edwards, 2000). Thus, teachers' being creative in using the most recent approaches, methods and techniques in planning and applying throughout their lessons as well as assessing their students' performances is strongly suggested. Similarly, presentations of well-planned examples among students' performances such as portfolios already created by the students can also be suggested to promote among the

teachers of the similar field of studies. Such kind of attempt would not be for show-off purposes, but for sharing the examples of performances among the teachers. This would facilitate communication and cooperation among teachers of the same school and/or teachers of teachers of various schools.

Linkage of research into teaching has been gaining importance. Learners gain much benefit when they are involved the research process actively especially when they actively involve in the research-based curriculum. It is strongly suggested to explore new ways integrate teaching sector and research arena (Healey, 2005; Robertson & Blackler, 2006). Policy makers and education planners require planning and applying most recent multi-level models, and linking data and research options regarding the teachers' educational activities. Among useful strategies facilitating practical usage of researching, developing research project practices through involving researchers and teachers as practitioners as part of partners to the research projects, interpreting on research findings published in journals, as well as strengthening communication among researchers and teachers as practitioners are reported to be useful (Ion & Iucu, 2016). Hence, research informed teaching in postgraduate studies has contributed positively to students' learning, maintain opportunities for spreading successful practices, offer ways and opportunities for teachers for developing continuously through research based teaching competences and excellences, obtain a research based educational background to conduct education based class-school-region-and-nation-wide researches. Meanwhile, students' perceptions and attitudes show positive changes towards using research informed teaching, which should be integrated curriculum of the postgraduate studies to promote postgraduate education (Zhu & Pan, 2015).

Thus, the formation of a multidisciplinary long-term and an intensive short-term project writing group with a disciplinary expert included in the writing group would be beneficial in supporting postgraduate students (Wilmot, 2016). Such kind of attempt would bring improvement on the professional productivity of the teachers, which is required to get enough support by using the purposefully formed group of experts, which is especially trained for supporting postgraduate academic practices. Such kind of experts in the group has been suggested to produce multidisciplinary both short-term and long-term projects and integrate postgraduate teachers either from private teaching sector and/or from state teaching sector to produce in these teams. This kind of attempt would increase number of qualified projects contributing the development of the education system in North Cyprus and decrease amounts paid to the individual projects. Also, such kind of group of expertises forming a group would help integrating both private and state teaching sectors together. Otherwise, private and state teaching sectors behave individually, but they do not cooperate and communicate unless it is very necessary. Supporting peer learning among private as well as state education systems in North Cyprus would be a solution for integration purposes. Thus, learning from peers has been considered as a fruitful framework for research education within the most appropriate pedagogic discourse (Boud & Lee, 2005).

4. CONCLUSION and IMPLICATIONS

The belief on 'one size fits all' has lost its acceptance, and graduate studies promote students' attempt to develop their professional learning and students' practical learning (Chadha, 2006). Factors for promoting universities in terms of lifelong-learning covers the idea that they should bridge transition routes from secondary education and working life into higher education. They also need to build a bridge between higher education, business areas and education of adults, and recognize all kinds of learning, flexible study formats and curriculum relevant to the institutions (Müller et al., 2015). On the other hand, Lee and Morris (2016) concluded that although lifelong learning and economic growth in Singapore have both increased, productivity rates, social mobility and life-quality have been decreased, and inequality of income among people has been raised. On the contrary, the Singaporean education has faced best practices, which has resulted in reforming in the education field. The study proves that lifelong education has positive contributions to the field of education. Therefore enrolling at postgraduate studies is one of the opening windows for introducing lifelong learning into teachers' life.

The present research showed that postgraduate studies promote and develop teachers teaching Science positively. Hence, their personal and professional skills, competencies and knowledge are improved. Similarly, postgraduate studies improve their students' learning, which mutually contributed to their practical learning and teaching. Thus, developing and promoting skills and competencies at work are important in learning and teaching performance and adapting teachers' general and particular knowledge, skills and competencies. They also help carrying out responsibilities regarding Science teaching and promoting themselves and their students at new tasks. Higher contribution to more highly educated and skilled teaching performance to the teachers teaching Science higher contribution to more globally advanced and competitive Science learning and teaching in terms of teachers and students. There are three main implications that present study could suggest. Initially, postgraduate studies contribute to teachers of Science in terms of improving their teaching skill capacities on instructional competencies, on teaching programme, on enrichment of instructional environment, on providing ways how to learn, on material development and on measurement and evaluation. Secondly, postgraduate studies affect teachers teaching Science in terms of improving their organization skills on content, method, events and duration. Finally,

postgraduate studies contribute to teachers teaching Science in terms of improving professional productivity on research and publication skills.

4.1. Limitations and Further Research

Present research has got a limitation, which is related to the generalization of the interpretations based on the findings. Though the main goal was to describe the perceptions of teachers teaching Science on how postgraduate education affects their lifelong-learning skills, further studies covering bigger samples with mixed methodologies may further improve the findings discussed in the present paper.

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GENİŞ ÖZET

1. Giriş

Yaşam boyu öğrenme, bireyin kendini kişisel ve mesleki anlamda geliştirebilmesi için kazandığı beceri ve yetkinlik olarak tanımlanmaktadır. Yaşam boyu öğrenme becerisi, üniversite mezunları için istenen ve beklenen bir sonuçtur. Yaşam boyu öğrenmenin doğasında sürekli değişim vardır ve öğretmenin gelişmiş bilişsel yeteneklere ihtiyaç duyması önemlidir. Bir öğretmenin kendini geliştirme açısından lisansütü eğitim anlamlı bir yere sahiptir. Araştırma becerisi, kendini geliştirmenin sürekliliğini sağlayacaktır. Yaşam boyu öğrenme, işgücü becerilerinin geliştirilmesinde önemli bir yere sahiptir. Yaşam boyu öğrenme, problem çözme, bağımsız çalışabilme, takım oluşturabilme, her düzeyde etkili iletişim kurabilme, öğrenmeyi özümseyebilme, mesleki gelişim ihtiyaçlarına kişisel ve/ya kurumsal olarak cevap verebilme becerilerini içerir. Yaşam boyu öğrenme, öğrenmenin bir parçası olarak, lisansüstü eğitim yapan öğretmenlerin özellikle uygulamalı çalışmalarına ve mesleki anlamda kendilerini geliştirmelerine olanak vermektedir. Lisansüstü çalışmalarını yürüten öğretmenlerin, bu çalışmalarda kendilerini geliştirmeleri ve ders işlerken lisansüstü eğitimin kendilerine sağladığı üst düzey beceri ve yetkinlikleri sınıfta yansıtmaları beklenir. Lisansüstü çalışmalar, Fen Bilgisi alanı öğretmenlerinin de yaşam boyu öğrenmelerini, kişisel ve mesleki olarak destekleyecektir. Fen Bilgisi alanı öğretmenleri teorik anlamda edindikleri bilgileri pratik olarak daha kolay kullanacaklardır. Bu nedenle, Fen Bilgisi alanı öğretmenlerin lisansüstü eğitimlerini daha iyi ve kaliteli gerçekleştirmelerine olanak sağlamak oldukça önemlidir. Böyle bir çalışma, Kuzey Kıbrıs'ın ortaokul ve liselerinde yapılan ilk çalışma olması nedeniyle oldukça öneme sahiptir. Ayrıca, böyle bir çalışma, lisansüstü programların düzenlemesine katkı koyması açısından da öneme sahiptir. Bu nedenle, Fen Bilgisi alanı öğretmenlerin lisansüstü çalışmalarının yaşam boyu becerilerini hangi yönlerden etkilediğinin belirlenmesi oldukça önemlidir. Bu araştırmada 'Lisansüstü eğitimin, Fen Bilgisi alanı öğretmenlerin yaşam boyu öğrenme becerilerini nasıl etkilediğine dair görüşleri belirlenmeye çalışılmıştır.

2. Yöntem

Bu çalışmada betimsel bir metodoloji benimsenmiştir. Çalışma, nitel durum çalışmasıdır. Çalışmada, amaçlı örneklem seçilmiştir. Kuzey Kıbrıs'ta çalışmanın yürütüldüğü dönemde, okullarda öğretmen olarak çalışan aynı zamanda lisansüstü eğitim yapan 11 Fen Bilgisi alanı öğretmenleri ile iletişime geçilmiştir. Bu öğretmenlerin, 9'u eğitim bilimleri alanında lisansüstü eğitim sürdürürken, 2'si fen öğretimi alanında lisansüstü eğitim yapmaktadır. Veri toplama sürecinde, ilgili öğretmenlerin sınıflarında dersleri işleyişleri gözlemlenmiş, sınıf-içinde gözlem formları tutulmuş, sınıf dışında ise öğretmenden her ders sonrasında günlük tutması istenmiştir. Ayrıca, her ders sonrasında, öğretmenler ile görüşmeler yapılarak, tutulan sınıf-içi gözlem formları üzerine öğretmenin görüşü sorulmuştur. Ayrıca, her öğretmen ile derinlemesine görüşmeler yapılarak öğretmenin lisansüstü becerilerinin yaşam boyu öğrenme becerilerine katkısına ilişkin görüşlerinin ne olduğu sorulmuştur. Derinlemesine görüşmeler ile katılımcıların görüşleri kaydedilmiştir ve her katılımcı ile en az iki saat süren görüşmeler yapılmıştır. Tutulan günlüklerde ise, katılımcıların sınıf-içi öğretimleri esnasında lisansüstü eğitimin yaşam boyu öğrenme becerilerine olan etkilerini anlatmaları istenmiştir. Her katılımcı sınıf-içinde en az 2 kez gözlemlenmiştir. Her gözlemin arkasından, her öğretmen ile en az 15 dakikalık toplantılar yürütülmüştür. Bu toplantıların amacı, katılımcılara her dersin amacına ilişkin sorular sormak, dersin amacının doğruluğunu teyit etmek ve araştırmacı önyargılarının önüne geçebilmektir. Toplanan veriler, içerik analizi yöntemi ile analiz edilmiştir. Veriler analiz edilirken kodlama yapılmıştır. Kod listesi oluşturularak geniş kodlar elde edilmiştir. Elde edilen geniş temalar; 'takım halinde çalışma', 'liderlik' ve 'proje yönetimi' olarak belirlenmiştir. Verilerin sentezlenmesi ile geniş temalara 'problem çözme' teması eklenmiştir. Daha sonraki adımda veriler doğrultusunda, 2 geniş tema birleştirilerek 'takım halinde çalışma ve problem çözme' teması olarak belirlenmiştir. Bir sonraki adımda ise, ana boyut olan 'lisansüstü eğitim ve öğretmenlerin yaşam boyu öğrenme becerileri' boyutu belirlenmiştir.

3. Bulgular, Tartışma ve Sonuç

Araştırmanın bu bölümünde bulgular, tartışma ve sonuç yer almaktadır. Araştırmanın sonucunda, 'lisansüstü eğitim ve öğretmenlerin yaşam boyu öğrenme becerileri' ana boyutu ile belirlenmiş olan temalar, 'takım halinde çalışma ve problem çözme'; 'liderlik'; ve 'proje yönetimi' şeklindedir. 'Takım halinde çalışma ve problem çözme' temasına ait belirlenen alt-temalar 'öğretim becerilerinin geliştirilmesi' ve öğrenme becerilerinin geliştirilmesi' şeklinde belirlenmiştir. 'Öğretim becerilerinin geliştirilmesi' alt-temasına ilişkin belirlenen kategoriler, 'öğretim yeterliklerinin gelişiminde yaşam boyu öğrenme becerisi' ve 'öğretim programlarının geliştirilmesinde yaşam boyu öğrenme becerisi' şeklindedir. 'Öğrenme becerilerinin geliştirilmesi' alt-temasına ilişkin belirlenen kategoriler ise 'öğretim ortamlarının zenginleştirilmesi için yaşam boyu öğrenme becerisi'; 'öğrencilerin yaşam boyu öğrenme becerisi kazandırılması için yaşam boyu öğrenme becerisi'; 'eğitimde değişim ve etkili öğretim konusunda yaşam boyu öğrenme becerisi'; ve öğretim materyallerinin geliştirilmesi ve (alternatif) ölçme ve

değerlendirme konusunda yaşam boyu öğrenme becerisi' şeklinde alt temalar belirlenmiştir. 'Liderlik' temasına ilişkin belirlenen alt-temalar, 'örgütsel becerilerin geliştirilmesi' ve 'yönetim becerilerinin geliştirilmesi' şeklinde belirlenmiştir. 'Örgütsel becerilerin geliştirilmesi' alt-temasına ilişkin belirlenen kategoriler 'içeriğe ilişkin yaşam boyu öğrenme becerileri' ve 'yönteme ilişkin yaşam boyu öğrenme becerileri' şeklindedir. 'Yönetim becerilerinin geliştirilmesi' alt-temasına ilişkin belirlenen kategoriler, sınıf içi ve sınıf dışı olaylara ilişkin yaşam boyu öğrenme becerileri'; ve 'süreye ilişkin yaşam boyu öğrenme becerileri' şeklindedir. 'Proje yönetimi' temasına ilişkin belirlenen alt-tema ise 'mesleki üretimin geliştirilmesi' şeklindedir. Bu temaya ilişkin kategoriler ise 'araştırma becerilerine dayalı yaşam boyu öğrenme'; ve 'yayın yapabilme becerilerine dayalı yaşam boyu öğrenme' şeklindedir. Bu çalışma, lisansüstü çalışmaların Fen Bilgisi alanında ders veren öğretmenlerin öğretimini olumlu yönde teşvik ettiğini ve geliştirdiğini göstermiştir. Bu nedenle, öğretmenlerin kişisel ve mesleki becerileri lisansüstü eğitim ile gelişmektedir. Benzer şekilde, lisansüstü eğitim yapan öğretmenlerin öğrencileri, kendi öğrenmelerine olumlu katkı koyabilmekte ve öğretmenleri bunu teşvik edip gereken yönde yardımda bulunmaya açıktırlar. Ayrıca, öğretmenlerin bilimsel olarak sınıf ve okul ortamlarında araştırma yapmaya açık olmaları, sınıf ve okul ortamlarının bilimsel anlamda daha gelişmiş olmasına neden olabilmektedir. Lisansüstü çalışmalar, öğretmenlerin öğretim yeterliklerine, öğretim programlarına, öğretim ortamlarının zenginleştirilmesine, öğretimin nasıl planlanacağına ve nasıl yürütüleceğine, etkili materyal geliştirme ve ölçme ve değerlendirme tekniklerinin etkin kullanımına ilişkin öğretmenlik yeteneklerini geliştirmeye etkin katkı koymaktadır. Ayrıca, lisansüstü çalışmaları, içerik, yöntem, olay ve süre ile ilgili örgütsel becerilerini geliştirmeleri açısından Fen Bilgisi alanında ders veren öğretmenlerin eğitim ve öğretim süreçlerini olumlu yönde etkilemektedir. Son olarak, lisansüstü çalışmalar, araştırma ve yayın becerilerinde üretkenliği geliştirmek açısından eğitim ve öğretime katkıda bulunmaktadır. Bu araştırma, lisansüstü çalışmaların Fen Bilgisi alanında ders veren öğretmenlerin yaşam boyu öğrenme becerilerini olumlu yönde geliştirdiğini göstermiştir. Ayrıca, lisansüstü eğitimlerini sürdüren Fen Bilgisi alanında ders veren öğretmenlerin kişisel ve mesleki becerilerinin, yetkinliklerinin ve mesleki bilgilerinin olumlu yönde geliştiği bulunmuştur. Benzer şekilde, lisansüstü çalışmaların kişinin öğrenmesine ve kişinin öğretimine karşılıklı olarak katkı yaptığı belirlenmiştir. Bu nedenle, lisansüstü eğitimi sürdürmek, işyerinde beceri ve yetkinliklerin geliştirilmesi ve teşvik edilmesi, performansın öğrenilmesi ve öğretilmesi, öğretmenlerin genel ve özel bilgi, beceri ve yetkinliklerinin uyarlanması açısından önemlidir. Ayrıca, lisansüstü eğitim öğretmenlerin Fen öğretimi ile ilgili sorumluluklarını yerine getirmelerine, kendileri ve öğrencilerini yeni görevlerde rol almaya teşvik etmelerine yardımcı olmaktadır. Öğretmenlerin daha iyi eğitimli olması, öğretmenlik performansına daha fazla katkıda bulunmaktadır.

Appendix 1

Interview Form: Effect of postgraduate education on lifelong learning skills of teachers of Science

Dear Teacher of Science,
The current aimed at describing the perceptions of teachers of Science on how postgraduate education affect your lifelong-learning skills. As part of research study, I am required to interview with you as a teacher of Science as well as a postgraduate student.

I would like to let you know that all information to be provided will be protected on a confidential basis.

Duration of participation in the study will last up to 2 hours since your perceptions on how postgraduate education you enroll affect your lifelong-learning skills are needed to describe in detail. Better use of time and the answers to the questions, I have intended to record the interview so that the record can be kept in detail.

I would like to thank you for your time in advance and start to the interview.

Effect of postgraduate education on lifelong learning skills of teachers of Science
A. The effect of graduate education on lifelong learning skills of teachers of Science in terms of Professional Productivity:
1. Research and publication skills
2. Teaching capacity skills
a. the ability to develop teaching competencies of faculty members
b. the ability to improve teaching programs
c. the ability to enrich teaching environments
d. To provide students with lifelong learning skills (ability to teach fishing)

B. The effect of graduate education on lifelong learning skills of teachers of Science in terms of Process Planning:
1. Ability to change in education (Time and process application)
2. Effective teaching skills
3. Ability to form learning
4. Ability to develop materials
5. Measurement and evaluation skills in education and alternative measurement and evaluation skills
6. Organizational skills (In terms of content, method, activities, duration)

Appendix 2
Observation Checklist

			Comment/s
Professional Productivity	1. Research skills		
	2. Publication skills		
	3. Teaching capacity skills	a. the ability to develop teaching competencies of teachers of Science	
		b. the ability to improve teaching programs	
		c. the ability to enrich teaching environments	
		d. to provide students with lifelong learning skills (ability to teach how to fish)	
Process Planning	1. Ability to change in education	a. Time Application	
		b. Process Application	
	2. Effective teaching skills		
	3. Ability to form learning		
	4. Ability to develop materials		
	5. Measurement and evaluation skills in education and alternative measurement and evaluation skills		
	6. Organizational skills	a. Content	
		b. Method	
		c. Activities	
		d. Duration	