An undergraduate primary education teaching practicum design and undergraduate primary teachers’ satisfaction on developing technological, pedagogical and mathematical knowledge

Spyros Doukakis*
Department of Primary Education,
University of the Aegean,
Grevenon 38, 152 34, Halandri, Greece
E-mail: sdoukakis@rhodes.aegean.gr
*Corresponding author

Christos Koilias
Department of Informatics,
Technological Educational Institution (TEI) of Athens,
Ag. Spyridon Street, 122 10, Aegaleo, Greece
E-mail: ckoilias@teiath.gr

Maria Chionidou-Moskofoglou
Department of Primary Education,
University of the Aegean,
Demokratias 1, 85 100, Rhodes, Greece
E-mail: mchionidou@rhodes.aegean.gr

Abstract: During the 2008–2009 spring semester, 25 fourth-year undergraduate primary teachers attended the compulsory course ‘Teaching Mathematics-Practicum Phase’. The course was organised so as to incorporate ICT and special mathematical scenarios in the teaching approaches of undergraduate primary teachers. This article presents this course’s satisfaction of participants as found in the research study. A set of powerful ordinal regression methods has been applied on a survey database. The most important results focus on the determination of the course’s weak and strong points, according to the MUSA methodology. The results show a high satisfaction level from the course. The global satisfaction level reaches 98% whereas partial (per criterion) satisfaction levels range from 90% to 97%, the lowest rate corresponding to the theoretical component of the course. These findings raise a number of research questions regarding ICT integration in undergraduate primary teachers’ teaching practice.

Keywords: undergraduate primary teachers’ teaching practice in mathematics; educational scenarios; students’ satisfaction; multi-criteria satisfaction analysis; MUSA; educational software for mathematics; technological pedagogical and content knowledge; TPACK.
An undergraduate primary education teaching practicum design


Biographical notes: Spyros Doukakis holds an MSc in Computer Communications and Networks – Leeds Metropolitan University, as well as an MSc in Basic and Applied Cognitive Sciences and has also obtained a Master in Education. He is a Teacher of Mathematics and Informatics at The American College of Greece, Pierce College and a PhD candidate of the University of Aegean, Greece. His research interest included pupil learning with technology, student assessment and teacher’s professional development.

Christos Koilias is an Associate Professor in Technological Educational Institution (TEI) of Athens, Department of Informatics since 1985. He studied Mathematics and received his MSc at the University Pierre et Marie Curie (PARIS VI) and his PhD at the University of Aegean in Information Systems. His main research interests are data structures and quantitative statistical analysis. He has written more than 40 books in information technology. He is an active member of Greek Computer Society.

Maria Chionidou-Moskofoglou is currently an Assistant Professor of Mathematics and Mathematics Education at the University of Aegean, Primary Education, Rhodes, Greece. In her former position as a Consultant in Pedagogical Institute, she took an active part in the preparation of the cross-thematic Greek National Curriculum in Mathematics as well as in service training teachers’ counsellors and teachers. Also, she was responsible for some new national mathematics textbooks and CD-ROMs for primary pupils. She was an Adjunct Lecturer for four years in Research Methodology at Hellenic Open University. Her research interests include: undergraduate teachers’ training, professional development of teachers, and gender and maths.

1 Introduction

In Greece, the educational changes of 2003 led to the ‘Cross Curricular/Thematic Framework’ (CCTF), which has been implemented in compulsory education since 2006. One of its general principles is “to prepare pupils to explore new information and communication technologies (ICT)” [Official Government Gazette, (2003), p.1]. In its effort to implement this new educational policy, the Pedagogical Institute (Ministry of Education) has developed textbooks and educational software (ES) for all teaching subjects. The ES produced is not to be used alone for the teaching of the subject, but is also for consolidation and supplementation and has been designed so as to complement and at the same time make use of the teaching materials for the teaching of the subject in primary education. Despite significant political will and spending by governments on technical equipment and training, levels of ICT integration in schools for learning and teaching are often low (Chionidou-Moskofoglou et al., 2007, Jimoyiannis and Komis, 2007).

Recently, research in educational technology suggests the need for ‘technological pedagogical and content knowledge’ (TPACK), which is based on Shulman’s (1986) idea
of ‘pedagogical content knowledge’, so as to incorporate technology in pedagogy (e.g., Hoyles et al., 2004; Hennessy et al., 2005; Keating and Evans, 2001; Niess, 2005; Mishra and Koehler, 2006; Cavin, 2007; Angeli and Valanides, 2009).

Therefore, from a constructivist viewpoint (von Glasersfeld, 1995; Cobb et al., 2001), ES integration into undergraduate primary teachers teaching practice is a crucial factor for teachers’ future ‘establishment’ and improvement in classroom practices. During 2008–2009 spring semester, our course on primary maths teaching during practicum (school attachment), was organised so as to incorporate ICT and especially-designed mathematical scenarios (Kynigos, 2006) in undergraduate primary teachers’ teaching approaches.

The framework in which the course is taught, as well as the need to discover its strong points but also those areas that require improvement, led to the investigation of the satisfaction level of undergraduate primary teachers. This investigation did not focus entirely on the evaluation of the teaching but on a wider spectrum of undergraduate primary teacher experience from the course.

2 Theoretical background

2.1 Technological pedagogical and content knowledge

Recently, research in educational technology suggests the need for TPACK, based on Shulman’s (1986) idea of ‘pedagogical content knowledge’, so as to incorporate technology in pedagogy (Niess, 2005; Mishra and Koehler, 2006; Cavin, 2007; Angeli and Valanides, 2009). This interconnectedness among content, pedagogy and technology has important effects on learning as well as on professional development. Mishra and Koehler (2006) suggest “…a curricular system that would honour the complex, multi-dimensional relationships by treating all three components in an epistemologically and conceptually integrated manner”, and they propose an approach which is called ‘learning technology by design’. In Mishra and Koehler (2006) approach they have conceived of a model that offers three unitary components of knowledge (content, pedagogy and technology), three dyadic components of knowledge (pedagogical content, technological content, technological pedagogical content) and one overarching triad (technological pedagogical content knowledge).

The ‘learning technology by design’ approach can be effectively supported by educational scenarios. Educational scenarios are in the form of ‘lesson descriptions’ that share the following characteristics: they focus on multi-perspective study of mathematics and other disciplines; they take advantage of the available ES; they include learning objectives, and, finally, they describe didactical sequence (Kynigos, 2006).

2.2 Student satisfaction

Satisfaction has been defined as the perception of pleasurable fulfilment of a service (Oliver, 1999). Operationally, the construct is similar to an attitude as it can be assessed as the sum of the satisfactions with various attributes of a product or service (Churchill and Surprenant, 1982). Whereas attitude, however, is a pre-decision construct, satisfaction is a post-decision experience construct.
Research studies on student satisfaction enriched the relevant literature with findings from the educational reality, too (Babin and Griffin, 1998; Desai et al., 2001; Gremler and McCollough, 2002; Appleton-Knapp and Krentler, 2006). Some of them focused on the quality of the provided education and the investigation of learning process effectiveness (Cohen, 1981; Marsh, 1987; Feldman, 1989; Cashin and Downey, 1992; Guolla, 1999). Student satisfaction seems to be dependent on a number of factors: gender, favourite learning style, age and occupation (Brokaw et al., 2004; Stokes, 2003). Furthermore, other factors that have been found to influence student satisfaction are: student expectations from the course, teaching style and quality of teaching, teacher expectations and number of students per class (Dana et al., 2001; DeBourgh, 2003; Lado et al., 2003). In Greece, the results of the research projects which have been carried out concerning student satisfaction have shown that global satisfaction is between 35.6% to 84% (Politis and Siskos, 2004; Siskos et al., 2005; Koilias, 2005; Diamantis and Benos, 2007).

Taking the above in consideration, the aim of this study was to investigate the level of satisfaction of undergraduate students who participated in the course. Data collection methods and research results are presented in the following paragraphs.

3 Research methods

The participants were 25 fourth-year undergraduate primary teachers (16 female and nine male) in the Department of Primary Education of the Aegean University, attending the compulsory course ‘teaching mathematics – practicum phase’ during the 2008–2009 spring semester. Undergraduate primary teachers had been informed about the research study as well as the confidentiality of the data gathered.

Two researchers had a three-hour meeting with the undergraduate primary teachers in the mathematics lab, twice a week. The lab held twelve PCs, with Windows XP, MsOffice 2003, internet access, mathematical software (educational software of Pedagogical Institute for Mathematics (ESPIM), geometer’s sketchpad, and mathematica) and presentation tools. The need for a technologically elaborate working environment that would encourage undergraduate primary teachers to use technology, led the research team to use many technological tools (the educator’s website, the course’s electronic mail, moodle as the course management information system, a forum, the research team’s blog and sms).

The research work was divided into five stages during the spring semester 2008–2009:

1. Quantitative data concerning undergraduate primary teachers, in particular:
   a. their attitude towards ICT
   b. their self-efficacy in ICT
   c. their attitude towards ES
   d. their self-efficacy in mathematics, were gathered three times.

2. The Cobb et al. (2003) experiment design procedure constituted the second stage and was in particular:
a Undergraduate primary teachers were given a suitable worksheet and they worked on mathematics and geometry tasks.

b After their paper and pencil work, they tried to work with the same tasks by using the national ESPIM. Each lesson consisted of the teaching of those strategies that incorporate the usage of ICT, so as to involve undergraduate primary teachers in the investigation of geometrical shapes and forms. Teaching was limited to geometry so that when undergraduate primary teachers come up with their own teaching scenarios (Kynigos, 2006), they will be able to use the suitable technological tools that are both efficient and investigatory. The ES used consisted of the micro-worlds: ‘geo-board’, ‘3D solid manipulation (solid-board)’, ‘calculator’ and ‘table tracking’ from the ESPIM.

c In each lesson, researchers used technological tools while undergraduate primary teachers participated as students taking a lesson in class.

d At the end of each lesson, undergraduate primary teachers were asked to fill out an electronic feedback form, contributing thus further to a discussion of the lesson that had just finished. The form focused on the development of TPACK in mathematics, with questions on the technological tools, the teaching strategies and the benefits gained from the lesson.

This procedure was repeated eight times during the spring semester 2008–2009.

3 Undergraduate primary teachers had to complete an assignment (first assignment) that consisted of the search for all geometry problems, activities and exercises involving geometrical shapes and solids in the national maths textbooks of fifth and sixth grade as well as seventh, eighth and ninth grade (Kassoti et al., 2006) they also had to work on two activities, two exercises and two problems of their choice (from the above units) using ESPIM. Furthermore, and without any assistance by the researchers, they were asked to create a spontaneous lesson plan for teaching the chapter of area of a parallelogram or the volume of a parallelepiped from sixth grade mathematics.

4 Undergraduate primary teachers were asked to participate and act as students in an educational scenario (Kynigos, 2006) created by the research group for the purposes of the lesson. The title of the scenario was ‘creating mobile phone networks’ and it constituted a holistic picture of a learning environment, without limitations but with the ability to focus on those aspects that the educator judged to be of importance. Then undergraduate primary teachers created their own educational scenario. They presented it to their peers who provided their feedback and assessed the scenario on an especially designed form. The creator of each scenario, having taken these comments into consideration, returned two weeks later and presented his/her improved version. Finally, undergraduate primary teachers self-assessed and gave feedback on their own scenario.

5 Semi-structured interviews were conducted.

In the last meeting, undergraduate primary teachers were asked to anonymously complete a questionnaire concerning their satisfaction from the course; the completed questionnaires were randomly placed in a box, ensuring thus that their answers would not be used in their evaluation. Twenty-four completed questionnaires were returned out of
the 25 that were handed out. In the next section, the research data analysis and results from the study will be presented.

4 Undergraduate primary teachers’ satisfaction research

4.1 Planning of the research

Research planning included the following four basic stages which were designed and implemented successively (Grigoroudis and Siskos, 2002):

a Preliminary stage: This first stage included identification and definition of the problem, followed by a preliminary analysis of student behaviour and investigation of the environment. The research team, after exhaustive discussions and taking under consideration the relevant international literature, specified the quality dimensions as well as the satisfaction ranges.

b Development of a questionnaire and gallop poll: In this stage, the research pattern was determined, the coding of the necessary information into questions was prepared and the carrying out of the research took place.

c Analysis: The third stage included data processing, using tools of descriptive and estimating statistics, as well as multi-criteria satisfaction analysis (MUSA) methodology.

d Results: During the last stage, the results from the processing of the questionnaires were estimated and evaluated.

4.2 Development of the questionnaire

The statutory rules and regulations, as well as the organisation and structure of tertiary educational institutes in Greece differ substantially from the ones of the respective institutions abroad. Therefore, it was imperative to detect the quality dimensions that correspond to the conditions of Greek higher education. Thus, taking into consideration

a the international literature

b Greek reality

c the structure of teaching of the particular course in the 2008–2009 spring semester

d relying greatly on the existing research by Koilias (2005) and Siskos et al. (2005), the following five quality dimensions (criteria) were defined and used:

1 educational programme

2 professor

3 mathematics lab

4 PhD researcher

5 educational material.
A four-page detailed questionnaire was developed, based on the previously mentioned quality dimensions. It included the following four parts:

a. Fill-in instructions.

b. Personal data.

c. Questions concerning satisfaction: this is the main part of the questionnaire and it includes questions related to undergraduate primary teacher satisfaction from each criterion and sub-criterion. More precisely, undergraduate primary teachers are asked about the degree of satisfaction from each one of the five criteria as well as their sub-criteria. For questions regarding evaluation of undergraduate primary teacher satisfaction from the 30 sub-criteria a five-point Likert scale was used (ranging from...
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“I totally agree” to “I totally disagree”). For questions concerning evaluation of undergraduate primary teacher satisfaction from the five criteria a five-point Likert scale was used (ranging from ‘totally satisfied’ to ‘totally dissatisfied’). The same five-point Likert scale was used to measure global satisfaction. Graphics representing feelings and opinions (☺ ☻ ☼) were used in order to facilitate the filling-in of the questionnaire.

d Open question: an open question was placed at the end of the questionnaire, so that undergraduate primary teachers could volunteer remarks and suggestions concerning course improvement.

The criteria and sub-criteria used in this research project are presented in Figure 1.

5 Results of satisfaction measurement

This chapter presents the most significant research findings, as these were derived from the analysis of the data. The methodology used was the MUSA (Grigoroudis and Siskos, 2002).

MUSA is based on the use of a collective value function that includes an accumulation of individual judgments, under the assumption that undergraduate primary teacher global satisfaction depends upon the characteristic dimensions of the provided services, which are represented by a set of criteria. It is a preference desegregation method that is implemented through an ordinal regression-based approach in the field of multi-criteria analysis. This approach is used for the evaluation of a set of marginal satisfaction functions, which results in the measurement of global satisfaction representing, as consistently as possible, undergraduate primary teacher judgments.

In the survey, undergraduate primary teachers were asked to state their individual satisfaction (global and partial). Taking into consideration the above mentioned assumptions, the problem can be approached as a qualitative regression problem and is solved through the use of special linear programming formulations, where the sum of deviations between undergraduate primary teacher global satisfaction evaluation and its multi-criteria satisfaction evaluations is minimised.

5.1 Global and partial (per criterion) satisfaction

Undergraduate primary teacher global satisfaction from the course was characterised as extremely high. The mean satisfaction value, as measured by the method, reached 98%, while it is of great importance to note that all comments were positive.

Undergraduate primary teachers also appeared satisfied in the partial (per criterion) satisfaction survey, where negative comments were sparse. For this reason, as well as due to the relatively small number of questionnaires, MUSA method judges all partial satisfaction criteria as of equal value. Levels of satisfaction ranged from 90% to 97%, the lowest regarding the theoretical component of the course. This criterion was the only one that prompted some negative (8%) and neutral (21%) comments.
5.2 Satisfaction per criterion and sub-criteria

5.2.1 Educational programme

The results for the educational programme criterion are displayed in the following table (Table 1).

<table>
<thead>
<tr>
<th>Sub-criterion</th>
<th>Weight</th>
<th>Satisf.</th>
<th>Demand</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Syllabus corresponds to current reality</td>
<td>23.8</td>
<td>95.80</td>
<td>-66.41</td>
<td>1.00</td>
</tr>
<tr>
<td>1.2 Course material was interesting</td>
<td>15.7</td>
<td>95.02</td>
<td>-25.29</td>
<td>0.78</td>
</tr>
<tr>
<td>1.3 Knowledge acquired during course will promote my career</td>
<td>14.3</td>
<td>92.85</td>
<td>-39.60</td>
<td>1.02</td>
</tr>
<tr>
<td>1.4 Knowledge from course helped me in comprehension of other courses</td>
<td>12.8</td>
<td>74.37</td>
<td>-37.56</td>
<td>3.28</td>
</tr>
<tr>
<td>1.5 Time available was sufficient to cover syllabus</td>
<td>14.3</td>
<td>81.83</td>
<td>-41.87</td>
<td>2.60</td>
</tr>
<tr>
<td>1.6 Course timetable was convenient</td>
<td>10.5</td>
<td>66.51</td>
<td>-23.91</td>
<td>3.52</td>
</tr>
<tr>
<td>1.7 Classroom conditions (air-conditioning, lighting, cleanliness, number of participants, etc) were good</td>
<td>8.6</td>
<td>41.63</td>
<td>-6.54</td>
<td>5.00</td>
</tr>
</tbody>
</table>

The most important sub-criterion for the educational programme of the course was 1.1 with a weight value of 24% and the highest satisfaction value (96%). According to these results, this sub-criterion placed itself at the extreme side of the action area (Figure 2). Second in order of importance came 1.2, with a weight value of 16% and a satisfaction value of 95%. This sub-criterion, too, was placed in the strong action area.

On the other hand, the least important sub-criterion was 1.7 with a weight value of 9% and a satisfaction value of only 42%. Most negative comments (50%), too, were made with regard to this sub-criterion. However, the above results did not place it in the action area but the status quo area. Also, it must be noted that this sub-criterion had a high
impact value; in other words, should the sub-criterion conditions be improved, the
criterion (partial) satisfaction value as well as that of global satisfaction would improve
greatly.

Finally, undergraduate primary teachers expressed neutral opinions with regard to
sub-criteria 1.2, 1.6, and 1.7, whereas for all other sub-criteria they appeared as
non-demanding.

The ‘demand’ index expresses the average deviation between satisfaction functions
and a normal or neutral (linear) function of values. Thus:

• neutral undergraduate primary teachers are those who, the more satisfied they
  declare to be, the higher the percentage of their fulfilled expectations

• demanding are the undergraduate primary teachers who declare themselves satisfied
  only when they receive the highest level of services

• non-demanding undergraduate primary teachers are those who declare satisfied even
  if the percentage of their fulfilled expectations is low.

5.2.2 Teaching personnel

The results for this teaching personnel criterion (professor and PhD researcher) were
extremely high in all cases. The results for this criterion are displayed in the following
tables (Table 2 and 3).

Table 2 Results for the teaching personnel sub-criteria (professor)

<table>
<thead>
<tr>
<th>Sub-criterion</th>
<th>Weight</th>
<th>Satisf.</th>
<th>Demand.</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Professor has scientific grounding</td>
<td>20.0</td>
<td>96.96</td>
<td>-59.00</td>
<td>0.61</td>
</tr>
<tr>
<td>2.2 Professor has knowledge of course material</td>
<td>20.0</td>
<td>97.92</td>
<td>-55.00</td>
<td>0.42</td>
</tr>
<tr>
<td>2.3 Professor facilitated knowledge acquisition</td>
<td>20.0</td>
<td>91.42</td>
<td>-58.40</td>
<td>1.72</td>
</tr>
<tr>
<td>2.4 Professor is approachable to students</td>
<td>20.0</td>
<td>97.25</td>
<td>-52.00</td>
<td>0.55</td>
</tr>
<tr>
<td>2.5 Professor has good conduct with respect to his/her students</td>
<td>20.0</td>
<td>98.50</td>
<td>-56.00</td>
<td>0.30</td>
</tr>
</tbody>
</table>

Table 3 Results for the teaching personnel sub-criteria (PhD researcher)

<table>
<thead>
<tr>
<th>Sub-criterion</th>
<th>Weight</th>
<th>Satisf.</th>
<th>Demand.</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 PhD Researcher has scientific grounding</td>
<td>20.0</td>
<td>99.17</td>
<td>-60.00</td>
<td>0.17</td>
</tr>
<tr>
<td>4.2 PhD Researcher has knowledge of course material</td>
<td>20.0</td>
<td>99.75</td>
<td>-60.00</td>
<td>0.25</td>
</tr>
<tr>
<td>4.3 PhD Researcher facilitated knowledge acquisition</td>
<td>20.0</td>
<td>96.67</td>
<td>-60.00</td>
<td>0.67</td>
</tr>
<tr>
<td>4.4 PhD Researcher is approachable to students</td>
<td>20.0</td>
<td>99.58</td>
<td>-60.00</td>
<td>0.08</td>
</tr>
<tr>
<td>4.5 PhD Researcher has good conduct with respect to students</td>
<td>20.0</td>
<td>97.92</td>
<td>-60.00</td>
<td>0.42</td>
</tr>
</tbody>
</table>

In all the sub-criteria mentioned above, positive comments constituted the vast majority.
For this reason, sub-criteria were judged to be of equal value. Satisfaction levels were
extremely high in all cases, ranging from 97% to 100%, with the sole exception of 2.3
(professor facilitated knowledge acquisition) which was 91%. In this case, only one
undergraduate primary teacher declared himself/herself as slightly dissatisfied. As a result, this sub-criterion appeared to be of a relative high impact (1.72).

5.2.3 Mathematics laboratory

The results for the criterion of mathematics laboratory are displayed in the following table (Table 4).

<table>
<thead>
<tr>
<th>Sub-criterion</th>
<th>Weight</th>
<th>Satisf.</th>
<th>Demand.</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 ES corresponded to the demands of the course</td>
<td>31.4</td>
<td>95.04</td>
<td>–73.79</td>
<td>1.56</td>
</tr>
<tr>
<td>3.2 Knowledge acquired in the lab helped me with the understanding of the course</td>
<td>16.7</td>
<td>91.23</td>
<td>–50.53</td>
<td>1.46</td>
</tr>
<tr>
<td>3.3 Skills acquired in the lab helped me with the understanding of the course</td>
<td>10.4</td>
<td>80.66</td>
<td>–23.32</td>
<td>2.02</td>
</tr>
<tr>
<td>3.4 Time available was sufficient to cover the syllabus</td>
<td>10.4</td>
<td>74.27</td>
<td>–23.32</td>
<td>2.69</td>
</tr>
<tr>
<td>3.5 Computers always operated very well</td>
<td>10.4</td>
<td>68.68</td>
<td>–23.32</td>
<td>3.27</td>
</tr>
<tr>
<td>3.6 Computers were updated</td>
<td>20.7</td>
<td>88.17</td>
<td>–44.09</td>
<td>2.44</td>
</tr>
</tbody>
</table>

The most important sub-criterion in the mathematics lab criterion was 3.1 with a weight value of 31% and the highest satisfaction value (95%). These results placed it in the extreme end of the action area (Figure 3). Second in terms of importance came sub-criterion 3.6 with a weight value of 21% and a satisfaction value of 88%. This sub-criterion, too, was placed in the strong action area/area of strong activity. Sub-criterion 3.2 followed in terms of importance, with a weight value of 17%. Last in terms of importance were 3.3, 3.4, and 3.5, all of which had the same weight value, 10%. For all three sub-criteria negative comments were made while undergraduate primary teachers appeared to be neutral. Of all three, the one of the highest impact was sub-criterion 3.5.

Figure 3 Relative action diagram for the mathematics lab sub-criteria (see online version for colours)
5.2.4 Educational material

The results for the criterion of educational material are displayed in the following table.

<table>
<thead>
<tr>
<th>Sub-criterion</th>
<th>Weight</th>
<th>Satisf.</th>
<th>Demand</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1 The available course-book was scientifically updated and appropriate for the needs of the course</td>
<td>11.3</td>
<td>66.37</td>
<td>-29.29</td>
<td>3.81</td>
</tr>
<tr>
<td>5.2 The available course-book helped me with course comprehension</td>
<td>10.7</td>
<td>62.48</td>
<td>-25.53</td>
<td>4.03</td>
</tr>
<tr>
<td>5.3 The course was effectively supported by the professor’s website</td>
<td>20.2</td>
<td>97.53</td>
<td>-60.45</td>
<td>0.50</td>
</tr>
<tr>
<td>5.4 The course was effectively supported by the forum</td>
<td>14.3</td>
<td>94.17</td>
<td>-44.00</td>
<td>0.83</td>
</tr>
<tr>
<td>5.5 The course was effectively supported by the blog</td>
<td>14.3</td>
<td>90.08</td>
<td>-44.00</td>
<td>1.42</td>
</tr>
<tr>
<td>5.6 The course was effectively supported by the course e-mail service</td>
<td>14.9</td>
<td>97.15</td>
<td>-12.56</td>
<td>0.42</td>
</tr>
<tr>
<td>5.7 Supplementary material available via the professor’s website helped me with course comprehension</td>
<td>14.3</td>
<td>93.00</td>
<td>-44.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

The most important sub-criterion under the educational material criterion was 5.3 with a weight value of 20% and the highest satisfaction value (98%). These results placed this sub-criterion at the extreme side of the action area (Figure 4).

Figure 4 Relative action diagram of sub-criteria (see online version for colours)

Less important sub-criteria were 5.1 and 5.2 with a weight value of 11% and low satisfaction values (66% and 62%). These two sub-criteria were the only ones that prompted negative comments. Also, both had a high impact value (3.8 and 4.0) and undergraduate primary teachers appeared to be neutral with respect to both.

The rest of the sub-criteria were of almost equal value, with a satisfaction value ranging from 90% to 97%. For all of these, undergraduate primary teachers appeared to
be non-demanding with the exception of 5.6, where undergraduate primary teachers appeared to be neutral.

6 Conclusions

In this article we briefly presented the design of an undergraduate primary education teaching practicum for students’ improvement in TPACK via educational scenarios. Also, the research outcomes concerning the satisfaction of those undergraduate primary teachers who participated in this teaching practicum were presented in detail. According to these outcomes the global satisfaction value for the theoretical component of the course (educational programme criterion) was 90%, 97% for the professor, 92% for the PhD researcher, 97% for the mathematics lab and, finally, 97% for the educational teaching and learning material. The global satisfaction level of undergraduate primary teachers from the course was very high, much higher than that of equivalent studies in other university departments of the country (Politis and Siskos, 2004; Diamantis and Benos, 2007; Siskos et al., 2005; Koilias, 2005). This discrepancy leads us to the posing of new research questions the high satisfaction level might be attributed to:

a The small number of undergraduate primary teachers-participants (Krentler and Grudnitski, 2004).

b The support undergraduate primary teachers received during the entire course via blog, forum, website and e-mail services. It is worth mentioning that the professor and the PhD researcher gave responses at the latest within the next day to the 400 e-mails receiving during the course. Furthermore, the forum received 140 messages (not counting those sent by the professor and the PhD researcher).

c The everyday communication of undergraduate primary teachers by two individuals (the professor and the PhD researcher).

d The possibility of ‘self-defensiveness’ on the part of the participants might have resulted in inaccurate responses since this was their first time to participate in a satisfaction research study.

It is our belief, therefore, that undergraduate primary teacher satisfaction in a learning environment that combines teaching in the university classroom and support via an appropriate learning environment plays a crucial role in the sustenance of programmes that incorporate ICT in teaching and learning. Additionally, the correlation between satisfaction and undergraduate primary teacher characteristics (learning style, attitude towards ICT and self-efficacy in the use of ICT) constitutes a crucial parameter in the improvement of the education provided (Doukakis et al., 2009). On the other hand, teacher characteristics, his/her method of making undergraduate primary teacher contact and his/her teaching style seem to affect undergraduate primary teacher satisfaction.

The above mentioned findings reveal that each new educational establishment has to adopt, an evaluation programme for its provided services, in order to obtain, amongst others, the necessary data on undergraduate primary teacher satisfaction about the course’s services (Elliott and Shin, 2002) so that a circled process will take place for the new course improvement.
References


