



The Factors Affecting Definition of Research Problems in Educational Technology Researches

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Abstract

Research problems in a scientific research are formed after a certain process. This process starts with defining a research topic and transforms into a specific research problem or hypothesis. The aim of this study was to examine the way educational technology researchers identify their research problems. To this end, sources that educational technology researchers apply to and factors that affect educational technology researchers during the process of defining research problem, and how educational technology researchers narrow research problems were examined. The research was carried out as a case study. Data were gathered from educational technology researchers by semi-structured interviews. Participants were ten researchers who were doctoral students and faculty members from three different universities. Data were subjected to content analysis. Findings presented under "Sources Used, Factors and Narrowing the Problem" themes related with defining research problem. Literature, individual factors and Academic Exchange were the common categories under these three themes. In addition, scope of the problem was identified as influential in terms of limiting the problem and identifying the problem. The results of the study are expected to be beneficial for educational technology researchers.

Key Words

Educational Technology Research, Research Process, the Process of Defining Research Problems.

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Scientific research usually starts with having a problem, willingness to solve a problem or interest in a topic. Thus, each study starts with a research problem and ends with a report (Dunne, Pryor, & Yates, 2005). A research problem can be identified with different ways. They include researcher's daily life experience (Maddux, 2003), problems faced in implementation, need for testing theories (Tomul, 2009) and recommendation raised by previous studies (Chow & Harrison, 2002; Johnson & Christensen, 2004). Besides interesting, researchable, manageable and fruitful topics, researcher's having sufficient preliminary information and skills about the topic and availability of related data affect definition of research topic (Brewerton & Millward, 2001, p. 20; Daymon & Holloway, 2002, pp. 22-23; Polonsky & Waller, 2005, p. 13). Additionally, discussion of potential research topics in scientific events plays an important role in defining the problem to be studied (Kwiatkowski & Silverman, 1998; Maddux, 2003).

After deciding on the research problem, the problem must be narrowed down and research questions must be written (Anderson, 1998). Many researchers point out that defining the problem bears critical importance for the whole research process (Bryman, 2007). In this point it is important to distinguish between the research topic and research problem. Research topics can be arising from researchers' personal experiences and knowledge gained by the different studies on the other hand research problem defines the speciality about the topic (Campbell, Daft, & Hulin, 1982 as cited in Bradley, 2001). Hence research problems contribute the development of interesting and significant theories or testing theories (Sandberg & Alvesson, 2011). Also they directly influence the connection with the literature and the research methodology (Bryman, 2007).

There are many different methods regarding problem defining process in the literature. They include referring to the literature, contemporary practices, personal experiences and applying to other disciplines (Alter & Dennis, 2002). Among others, identifying research gaps is the most outstanding method (Alvesson & Sandberg, 2011; Sandberg & Alvesson, 2011). Such studies are focused on three different cases. Firstly, as controversial items are identified in the literature, studies are carried out to enlighten these items (Kwiatkowski & Silverman, 1998). Second, complementary studies are carried out in relation

with previous studies in the literature (Tsui, Zhao, & Abrahamson, 2007). Third, studies are carried out to identify and close the practical gaps in cases where theoretical studies are completed but not implemented yet (McMillan & Schumacher, 2010).

Researchers think in relation with defining the research problem that critical thinking is needed to find out contemporary and new issues under circumstances (Maddux, 2003). This suggestion could guide researchers engaged in educational technology, which is multidisciplinary and affected from technological improvements. The literature presents many studies on describing research trends in educational technology (Alper & Gülbahar, 2009; Göktaş et al., 2012). Those examples provide valuable information about research topics studied both in the past and today. However, Liu (2008) argues that in relation with educational technology studies trends alone would not be useful for defining research problems, thus those instruments cannot entirely respond to requirements of educational technology. To illustrate, Reeves (2000) puts forward three main issues regarding educational technologies research: researchers are not able to discriminate basic and applied researches, researches in this are not strong enough, literature review and meta-analysis is not satisfactory and they are not guiding enough for researchers. Also owing to the fact that educational technology has a wide coverage, it is applied and used in many areas (Erdoğan & Çağiltay, 2009), referring to different researcher perspectives will help young researchers improve their point of view. These studies in the literature demonstrate that the process of defining research problem in educational technology deserves as much attention as other areas.

The aim of this study is to examine the way educational technology researchers identify their research topics and problems. Particularly, answer is sought for the following research questions.

1. What sources educational technology researchers apply during the process of defining research problem?
2. What factors affect educational technology researchers during the process of defining research problem?
3. How do educational technology researchers narrow a research problem?

Method

Research Model

The research was carried out as a case study. This methodology was selected in order to deeply examine the experiences of educational technology researchers related with defining research problems and find out factors that dominate in this process (Creswell, 2007; Johnson & Christensen, 2004).

Participants

The participants of the study were doctoral students and faculty members in the area of educational technology. Purposive sampling method was used in order to select participants. Thus, by using maximum variation sampling doctoral students and faculty members in the area of educational technology from three different universities were included in the study. Participants were ten researchers who were members of Computer Education and Instructional Technology (CEIT) department in Turkey, coded as K1, K2, K3, K4, K5, K6, K7, K8, K9 and K10.

Data Collection

Semi-structured interview protocol was used as a data collection tool. With the help of this protocol data were gathered about the participants' process of defining research problems. This protocol contains five questions in order to reveal out the process of defining research problems of participants. The focus of questions was how to define and limit the problems.

Data Analysis

Interviews captured with a voice recorder and transcribed. By taking research problems of study into consideration data were analyzed by using content analysis. In this process first of all data were conceptualized; then according to determined concepts data arranged and the best themes that explained data were determined (Miles & Huberman, 1994).

Validity and Reliability

To ensure the trustworthiness findings were examined by different researchers and expert opinions were taken in the research process. For transferability, purposive sampling method were selected, themes and codes were presented by

direct quotations taken from participants. For conformability, all transcripts were kept examined by different researchers. In the research process peer review were used and codes were investigated by a different researcher.

Results

In this section, results of analysing research findings and methods applied for defining research problems are presented under themes "Sources, Factors and Limiting the Problem". Captions and themes regarding each of the research problems are presented in tables.

Sources Used

In this study, researchers' opinions regarding instruments and methods applied while defining problem are investigated. Collected data were coded and presented in categories. The sources applied in problem defining process are given in four categories as "Literature, Academic Exchange, Area of Study and Individual Factors".

Factors

Also the factors affecting researchers in defining problems are included in this study. Though study findings look alike the sources used, this theme also resulted in the category "Scope of the problem". Opinions obtained under factors are given in four categories as "Scope of the Problem, Literature, Academic Exchange and Individual Factors".

Limiting the Problem

In this part, researchers' views regarding how to limit research problems are given. Their views are presented under five categories as "Research method, Literature, Academic Exchange, Individual Factors and Scope of the Problem".

Discussion

This study investigates the process of educational technology researchers' defining scientific research problems in the light of themes such as resources used, factors affecting the process and limiting of the problem. It was found out that researchers apply to literature as an important source for defining research problems. Also they use literature at a considerable extent for defining and limiting

the problem. Bradley (2001) and Shugan (2003) found that literature review plays an important role in defining the research problem. Other studies reveal that literature assists researchers in defining research problems often (Chow & Harrison, 2002; Ellis & Levy, 2008; Johnson & Christensen, 2004; Law, 2004; Maddux, 2003). Referring to literature may include investigating issues that are not clarified yet, filling in the blanks and application of theoretical knowledge. Often use of literature might be explained with its easiness to use, not being controversial, being a safe way, being recognized and being supported by research institutions (Sandberg & Alvesson, 2011).

The findings show that researchers apply to academic sharing during defining of the research problem and thus they refer to the shared items while limiting the problem. Some of the participants study PhD. By academic sharing, they also mean interviews with their academic advisors. All of the participants, particularly those in PhD, frequently experience academic sharing by means of seeking for expert and peer opinions. Relevant results in the literature also support this finding (Aslam & Emmanuel, 2010; Lei, 2009; Maddux, 2003; Tunçel, 2001). As an example, Bostancı and Yüksel (2005) in their study about defining the research problem point out that academics should feel free to apply to academic people and their experience. According to Bradley (2001), it is essential that researchers criticize each other's works for both developing critical thinking skills and connecting theory with practice. In a similar vein, Kraut, Egidio, and Galagher (1988) say that science is a social process beyond seeing scientists as individuals engaged in instruments and tools in laboratories, and discuss the role played by social interaction in putting forward scientific studies. In this context, they also mention the effect of physical closeness on improving cooperation between researchers and the potentials technology bears for enabling distant researchers to collaborate. In our study, some of the participants stated that they exchange contemporary materials with their colleagues via internet for defining the problem. To this end, one participant keeps up with academic networks such as discussion lists, forums and virtual platforms of universities in relation with her/his field to define research problems.

The study demonstrates that researchers are guided by such personal matters as time, working environment, researcher competence and cost in deciding on and limiting the problem. Likewise,

Aslam and Emmanuel (2010) put out that time and cost are among factors that should be considered in defining research problems. According to Fraenkel and Wallen (2003), a good research problem must be researchable within a certain amount of time with a certain amount of effort. Also according to our study, researchers' areas of interest and ability, professional experience, other experience and area of expertise, corresponding to individual factors, are effective in defining research problems.

Under examination of obtained themes with individual factors, in respect of putting area of expertise into practice, educational technology researchers coming from other fields are able to integrate their discipline with educational technology. Also Alter and Dennis (2002) suggest that research problems can be defined by referring to other disciplines. Looking from this perspective, diverse background in problem defining process would inevitably make scientific research more efficient and higher quality, and play an important role in bringing up qualified workforce, producing knowledge and serving to the community (Erdem, 2006).

We also found out that participants define research problems in association with some problems they face in their lessons or working environments. Similarly, Tomul (2009) points concrete problems faced in implementation as a method of defining research problems. In this context, researchers noted that they particularly study matters and real problems in their fields. It was added that the field has a wide range of topics in problem defining process as it is about technology. For example, Erdoğan and Çağiltay (2009) suggest that educational technology has such a large coverage that it is implemented and used in many areas. Though mainly supportive of the findings, Maddux (2003) points out that real life problems can be a source of research problems. The participants stated that they also are inspired by examples of integration of modern technologies with education.

Conclusion and Recommendations

This study identifies how the process of defining research problems in educational technology takes place. Hence, it is thought that our study could help find out what researchers consider in defining research problem. On the other hand, as this study is carried out with a limited sample group, further studies can be done to explain research problems better.

The process of defining the research problem is discussed under three themes as sources applied to, factors and limiting the problem in the light of findings. Detailed discussion of the three themes provides other categories such as literature, individual factors and academic exchange under all of the three themes. Thus, it can be said that found categories accompany the process of problem defining. Apart from these, it is found out that applications peculiar to educational technology are used in defining research problems. In other words, the area of study is influential at this stage. Concerning the facts affecting researchers in deciding on the problem, scope of the problem seems outstanding besides the three common categories. In this context, it was found out that contemporary, authentic and promising topics become influential for researchers' making decision. As for narrowing down of the problem; research method, sample selection, research period and reliability and validity studies guide researchers besides the scope of the problem studied.

As a conclusion, putting forward the research problem is the most important component of scientific research. It is underlined that defining of the research problem is influential on the whole study; in this way, decision can be made on how to carry out the research and what method will be used then. At this stage, it is thought that research methods are mere tools and these tools can be used only if there are concrete aims (Reeves, 2000). Departing from the importance of proper identification of the research problem for the rest of the scientific process, following recommendations can be made:

- At postgraduate level, further courses must be offered regarding the importance of literature and review of literature.
- Constant contact should be kept with scientists so that information and experience can be exchanged, and academic events such as symposium, conference, meetings, etc. should be followed for new opportunities. Moreover, postgraduate students should be encouraged to all academic activities.
- Constant and efficient relations should be established between implementing bodies at national level and scientists in order to solve contemporary problems and propose effective results.
- Study topics should be researchable and feasible taking into consideration time and specialization requirements.

- While defining the research topic and problems, individual factors such as areas of interest and specialization should be considered.
- Selected research problems should be contemporary, authentic and beneficial for the discipline, and trends in the discipline should be followed.
- Researchers especially in educational technology, as a rapidly changing and developing area, should have a road map for identifying research problems.

Researchers can form their research groups and divide tasks, so they can keep up with improvements in today's world because things change so quickly. Also they can share their knowledge and justify their studies, and criticize each other's studies.

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