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THE ACTIVE PARTICIPATION OF SUBJECT MATTER EXPERTS IN ECOURSE PRODUCTION: A CASE STUDY FROM ANADOLU UNIVERSİTY OPEN EDUCATION SYSTEM

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Abstract:
Storyboard is used in the field of e-learning as a tool for the subject matter experts and instructional designers to speak the same language while producing e-course materials. In this study, the roles of the subject matter experts who are the keystones of the team that produce storyboards of e-learning materials within Anadolu University Open Education System and their experiences were examined, in an attempt to evaluate the e-course production system. For this reason, a qualitative case study design was used and interview data were collected from subject matter experts, technical production staff and decision-makers. Qualitative data analysis revealed that the roles and responsibilities of the subject matter experts should be well defined and more clearly structured, they should be trained on certain aspects of storyboard development; and their communication and collaboration with the production team needs to be more regularly planned and continuously kept alive.

Keywords: lifelong learning, distance education, storyboard production process, administration of distance education, distance higher education

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1. Introduction

Anadolu University has been carrying out higher education activities at associate's and bachelor's degrees within the body of Open and Distance Learning System in Turkey since 1982. It also serves in lots of other countries where a Turkish-speaking population exists such as Azerbaijan, Bulgaria, Kosovo, Macedonia, Albania and Bosnia-Herzegovina to nearly 1.3 Million actively enrolled students. Beyond benefiting from printed materials and television podcasts while carrying out the courses in the open and distance learning system, it also tries to serve its learners with various information and communication technologies such as internet, e-learning, videoconference etc. and help them adapt these. Additionally, face-to-face academic counseling and practice classes are also offered as well. Almost 75% of our registered students are currently working and 91% of them have access to the internet, which implies that they have limited time to study the printed material and therefore largely prefer e-learning materials and environments such as ebook (PDF), audiobook (mp3, daisy), interactive ebook, unit and question based videos, unit summaries (PDF, mp3), e-course (HTML5 supported), quizzes (online, PDF), webinars and discussion forums.

In our open and distance learning system, e-learning materials have been developed and put into service for the learners in different ways such as interactive e-books, e-courses and audio books since 1990s. The changes in policies and technological opportunities affected the strategies about the use and production of the e-learning materials in time. First, courses were transformed into e-learning materials by assigning subject matter experts, instructional designers and production teams to this job with fragmented roles. The production process started with obtaining the educational content from the subject matter expert. Then, the instructional designer prepared a storyboard based on this content. After that, the storyboard was transformed into an e-learning material by a web developer. In the next stage, the production of e-courses nearly halted because of technological limitations. But with the flourishment of e-learning authoring software supporting HTML5, a new period started with a decision made in line with the goal of rapid e-learning material production to complement the coursebook, set by Anadolu University Open Education System in 2015. The process differed from the former in the sense that storyboards were used as a medium for communication of the e-course design, and the faculty who are experts in the subject matters chosen for this process were involved as storyboard writers this time. Their role was both to develop the storyboard based on the unit content in the coursebook taking the learning objectives of the unit as a basis for the design of the storyboard. It is quite important to note here that in our case, there are coursebooks written for each course offered in the system and all e-learning activities are dependent on them in terms of content and organization. Therefore, content writers in our case are other subject matter experts not involved in e-course production directly but only through their content.

2. The Production Process of e-Learning Materials

In the planning, preparation, development, implementation and evaluation stages of the production of e-course materials in Anadolu University Open and Distance Learning System, ADDIE (Branch, 2009) and P3 models (Khan, 2004) were adopted as a reference for the roles and responsibilities of the participants in the production process, which was elaborated below.

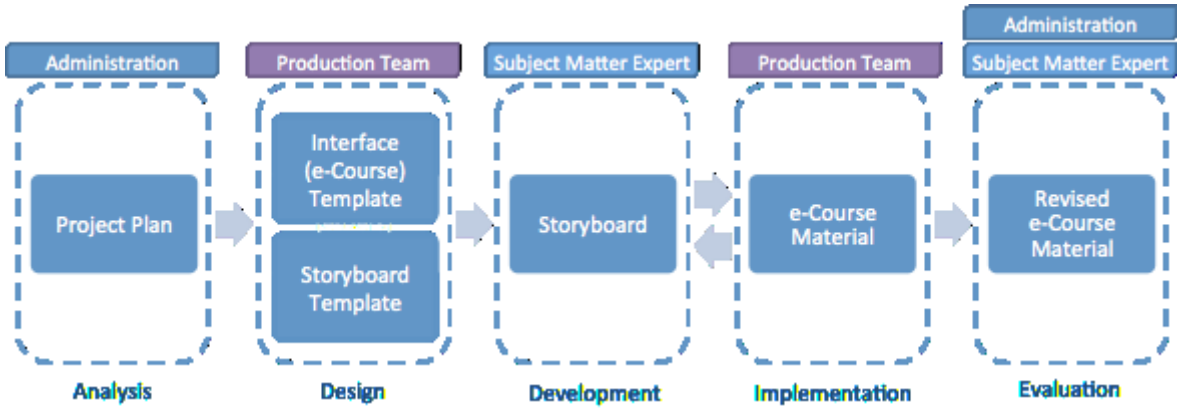

Figure 1: Anadolu University Open Education System e-course Production Model (adapted from ADDIE (Branch, 2009) and P3 (Khan, 2004))

2.1 Analysis

Analysis stage is the stage where managerial decisions and future policies are made. In this stage, setting the learners' needs and deciding which strategy should be followed to satisfy these needs are planned. Accordingly, it has been decided to develop e-course materials appropriate for the Open and Distance Learning system to make learning processes more effective, productive and attractive. In order to reach more learners with these e-course materials to be produced, it has been planned to start production with the courses which are taken by the highest number of students. At this stage, the questions answered were: "Which programme will be used to produce the e-course material? Who will be in charge of the production of the e-course material? How will the SMEs and production team cooperate?"

It is emphasized that an interdisciplinary working environment should be created to reach qualified results in the production of an e-course material (Oblinger and Hawkins, 2006). In the production model previously used in Anadolu University Open Education system, the process used to start with providing the content from the SMEs, went on with the storyboard, which covers the appropriate instructional strategies for the content to be prepared by an instructional designer and finished with turning the storyboard into an e-course by the production team. But within the new production model used in this article, SMEs have been benefited from in order to plan a fast production and prevent communication problems between the SMEs and the instructional designer about how to present the content (Okur and Gümüş, 2010). In

other words, the roles and responsibilities of the instructional designer have been given to the SMEs. Thus, the role of setting the instructional strategies by transforming the given content into an interactive storyboard have been performed by SMEs and the role of turning these into e-course materials have been performed by the production team. So, with the help of the storyboard, a healthy communication has been created between the SMEs and the production team; and a common jargon has been set. Storyboard may be prepared by SMEs with special software and also basically with Word or PowerPoint as well. According to the structure of the course to be prepared, Word program can be chosen for the content which consists of mostly text; and PowerPoint can be preferred for the content which consists of mostly visuals and animations.

Since the material is preferred to work on nearly every platform in a medium-free way, it is important to choose the best medium among the programs that can give HTML5 outputs. In addition, the software is determined considering the license costs, abilities of the program, capability to produce fast and its ease of use.

2.2 Design

The design stage can be defined as the stage where the production team bears the major responsibility (Figure 1). In this stage where the interface of the e-course material is designed, a storyboard template compatible with the interface is also designed. Which interaction activities are to be used are decided in this stage as well. In the e-course material, it is aimed to show the learners with which content the goals are connected by presenting the content in a goal-based way. It has been planned to let the visually impaired people benefit from the course as well by vocalization. Using vocalization and various visual and animating items in the e-course plays an important role on making the material more effective, productive and attractive.

2.3 Development

Since this stage covers producing storyboards, SMEs have a more active role in this stage. SMEs have been trained about how the storyboards are produced and how they are used to produce an e-course material.

The term "storyboard" was first used for the animation called "Plane Crazy" in 1928 by Walt Disney. Disney used numbered panels which showed how the film would look like before it was produced, then it turned into the way how it is still being used in 2000s. Storyboard was used to develop the film "Steamboat Willie" in which Mickey Mouse was born and which is the most popular of the preliminary animation films in 1932. Disney basically used storyboard as adjoining panels that included the text explaining the content on the screen on one side, and the draft drawing which showed how it would look like on the other side. A storyboard is a place to plan out a visual story in two dimensions, the first of which is time and the second interaction: how the audio—the voice-over narrative of your story and the music—interacts with the images or video (Lambert, 2010). The storyboard process shows us how the screens will look

like one by one. If one of the screens isn't appropriate for the streaming, that screen can easily be corrected or removed (Thorn, 2011).

In an e-learning setting, storyboard defines how an e-course will look like in the end screen by screen. It is not the final product. It is an intermediate product for making an interactive e-learning material by web developers (Ghirardini, 2011). Storyboard is used to show what will be recorded, what is necessary or not in an e-course in which there are especially audio and video recordings (Moore and Kearsley, 2005). It also aims to plan and design interaction activities such as pop-ups, drag-and-drop, fill in the blanks, matching, and ordering. Storyboards may play a pretty functional role for using the same jargon among the SMEs, instructional designer and developers who are in cooperation while producing e-course materials. Research shows us that the cooperative but not individual production of e-courses results in high quality e-courses (Oblinger and Hawkins, 2006). Thus, storyboard as an intermediate tool may be beneficial for teamwork in the production of e-course materials, and for this very purpose, storyboard is used by Anadolu University Open Education System.

The production of the e-course materials should be very well organized because it includes people from different backgrounds, different titles and working routines. Although SMEs possess the key position at this stage, they are not fully independent or autonomous decision makers in any case as what they project on the storyboard template is the basis for the final product, which is dependent on the capabilities, limitations and principles of design.

2.4 Implementation

In the implementation stage, the production team has an active role since they produce e-course materials based on the storyboards made. Sometimes SMEs may demand some changes on the final product (e-course material), so they may also play a role in this stage. As a result, SMEs' revisions on storyboards are made by the production team in this stage.

2.5 Evaluation

In this stage, the final e-course material is checked by the SMEs. After all the corrections are made, the e-course material becomes ready to be published.

The purpose of this study is to develop implementation suggestions for the future e-course production processes. In order to evaluate the process and come up with solutions for diagnosed problems, the experiences of the stakeholders (subject matter experts, technical production team, and decision makers), who participated in the e-course production process between October 2015 and January 2016, have been revealed.

3. Method

Educational change is technically simple but socially complex. A large part of the problem of educational change may be less a question of dogmatic resistance and bad intentions and more a question of the difficulties related to planning and coordinating a multilevel social process involving lots of people (Fullan, 2001, p. 45). This is why this study focused on three different groups of people in an attempt to see how well they benefited from the planning and coordination of the storyboarding process.

Herbert Blumer argued that "*as human beings we act singly, collectively and societally on the basis of meanings which things have for us*" (1995, p. 115). By monitoring how people attribute meanings to situations and processes, it is possible to identify certain patterns that exhibit the constraints of the macro on people (Woods, 1996).

The purpose of the study was to investigate a new policy for developing storyboard designs as a framework for e-learning material needed to support open and distance education in Anadolu University Open Education Faculty, through examining how the process was experienced by the stakeholders. The policy was to attach new roles and responsibilities to the subject matter expert in the development of storyboard. Therefore, this study was designed to describe and understand the essence of meanings of individuals who have experienced a particular case, which is the increased participation of subject matter experts in storyboarding in a single case of policy change in Anadolu University Open Education System. These experiences are of significant value for our institutional memory which needs to be handed on to future research and implementation.

In an effort to realise this purpose, an interpretive qualitative case study research design was used.

Interpretivist understanding emerged as a reaction to mechanical and strict positivist method that considers natural phenomena and social phenomena as equals (Slattery, 1992). The experiences of subject matter experts were interpreted with an aim to improve the process so that it would be more meaningful for the distance learner, the author of the course material, and for the organization in general. For data collection purposes, semi-structured face to face one to one interviews were conducted for two groups of participants involved in the new storyboarding process for triangulation purposes. The first group of one to one interviews was conducted with nine subject matter experts (SMEs) one by one, who constituted the total group of SMEs involved in the new e-course production process. When selecting participants for a case study like this, it is critical that all of them must experience the case (Creswell, 2009), which means criterion-referenced sampling technique was used to select participants. Sample size is not usually of significant value in case studies like this, since we are interested in the way meaning is constructed, and large variations of linguistic patterning can emerge from a small number of people (Potter & Wetherell, 1987). Second, two one-to-one face to face semi-structured interviews were conducted to collect data from the policy makers, who were also subject matter experts not involved in this development process

but holding administrative positions at the time. The final group of participants was the e-course development and production team, who consisted of graphic designers and instructional technologists whose role in the process, is to collaborate with the subject matter expert who has developed the storyboard, and to give the e-course material its final form. In this particular case, there were 8 of these developer/producers participating in the process, all of which were interviewed using a semi-structured face to face focus group interview. The semi-structured interview protocols for three participant groups were prepared by the researchers, and reviewed by both an expert and a peer researcher for feedback and revised before data collection started.

Qualitative data are produced from social interactions, so they are constructions or interpretations. There are no 'raw' data, which are not influenced by human thought and action. Therefore, data analysis is the 'reconstruction of constructions' (Freeman, deMarrais, Preissle, Roulston, & St. Pierre, 2007). The interviews were recorded and transcribed for the purposes of data analysis. Transcripts of all the interviews were transcribed verbatim rather than just the responses of the interviewee. All documents and the interviews were analyzed through content analysis, the units, their labels and the categories were displayed by the researcher on a table as suggested by Miles and Huberman (1994). First of all, all three groups of interview transcripts were read and researchers became familiarised with the data. Upon coding the transcripts on the margins of subject matter expert interviews data, mindmapping technique was used to put these codes into categories using Mindomo online mindmapping software. Next, the focus group interview data of the team of e-course producers were coded on the page margins and then put together into categories. The same was done for the group of administrator interviews, and finally these three groups of categorised data were compiled into themes. The final table that was produced as a result of this analysis process helped the researchers to write up the findings and results.

4. Results and Discussion

The themes that were extracted from our data represent both the general perceptions and evaluations of SMEs on their experiences, and also what meanings them and other parties involved make regarding these experiences, which depict themselves roughly as components of e-course production process. These components include initiation and management, which refer largely to decision making; technology, content management, and visual design, which are more process-oriented; and SME perceptions, quality assurance and learned lessons, which could be considered as an evaluation component.

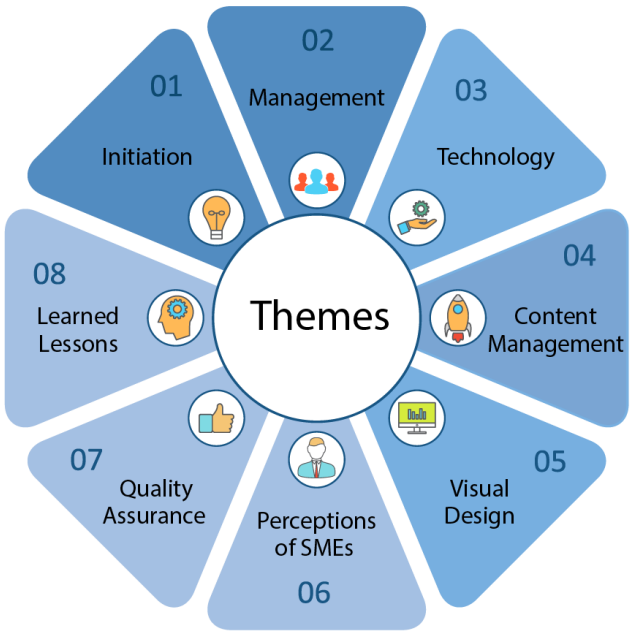

Figure 2: Themes extracted from interview data

4.1 Initiation

According to the findings, the first theme is initiation, in which policy makers or administrators make decisions as to *why* to proceed with the production work. These decisions primarily include identifying why e-course is needed. According to findings, the most prominently shared goal of the e-course production process by participants was to make learning easier with the help of technology. Administrators commented that e-course was determined as a material assisting distance learning because it is considered a more attractive learning material. Another goal shared by administrators is that it aims to address different learning styles. In a study on the learning styles of a group of undergraduate students taking online courses, about half of the students (46 percent) surveyed were introverts, sensors, and judgers (Mupinga, Nora & Yaw, p.187, 2012). This is not surprising because introverts need space and time alone, making the Web learning environment ideal. Finally, another significant goal of e-course production process stated by administrators was to reduce the dependence of learners on the coursebook. These serve the purpose of increase the diversity of materials that the system presents to learners, which was also claimed to be a goal by administrators.

Under this theme, another category, which is the reasons for the decision to start producing e-course, emerged. Learner demand, the fall in the rate of e-learning material use, and the rapid spread of communication and information technologies as a pushing factor were found to be factors pushing the administrators to take action to produce e-courses.

Findings also revealed the significance of storyboard and its use in the production process by SMEs and the experts in the production team. Both administrators and SMEs expressed storyboard as an indispensable component of e-course production because of several reasons. First of all, storyboard was found to be critical because of its role to be a medium of communication and cooperation between

the experts in the production team and the SMEs. Through the use of a storyboard written by the SMEs based on the coursebook content, a common language was targeted to be spoken by the two parties, which eases team work and continuous cooperation. This cooperation was also significant in the name that it enabled the content to be more reliable. The storyboard is the agent that makes the inclusion of the SMEs into the production process possible, and this inclusion is critical both in terms of the healthy progress of the process and the quality of the final product. The healthy progress of the process was possible through the use of storyboard as it was reported to plan, structure and organize the process better. Other advantages of storyboard that were reported by the participants were that it made mass production of the demanded material in a short period of time, and the time and expertise invested in storyboard would also be useful to the context for the production of other supplementary materials. On the other hand, a couple of participants commented that storyboard is critical as it would reduce our dependence on the SMEs in the long run. Although the process was planned in a way to include the content knowledge and expertise of SMEs through the storyboards they write, the dependence on SMEs may also be time-consuming. As well as bridging the gap between the SMEs and the production experts, storyboard also was expressed to bridge the gap between the content writer and the production team members. The content writer is only included in the process through the coursebook he contributed to the system with. However, no other contact is made with him during the e-course production. Instead, another SME was chosen to prepare the storyboard so that the content could be integrated into the e-course.

4.2 Management

According to the findings, the second theme is management, in which policy makers or administrators make decisions as to *how* to proceed with the production work. Course selection criteria were the primary category that was identified in the management theme. Courses included in the production process were selected according to two criteria, which are the high (considerable) number of students enrolled in a course, and low academic success. The determination of which SMEs were chosen to take part in the production of e-course was done based on two criteria, which were willingness, and high level of computer literacy.

The role of SMEs in developing the storyboard so that the production team could come up with the e-course material was another central category emerged under this theme. When what the three groups of participants reported as to the role of SMEs were compiled, three differing roles, which are determining the content, instructional design, and collaborating with the production team, were faced. SMEs are the most suitable group to decide on what content will be delivered because of their qualifications such as expertise and teaching experience. SMEs are responsible for ensuring that the content of the online course is an appropriate alternative to the lecture content normally given in a traditional course, working as an integral part of the team throughout the development process, ensuring that the online course content is easy to access and interesting for the

students, and finally ensuring a pedagogical "match" among the course objectives and the content (Caplan, 2004). Findings revealed that the most critical role ascribed to the SMEs is that of preparing a storyboard which presents relevant, accurate, and the dramatically important parts out of the unit content. They also said that SMEs are a critical component of this process because of their instructional design responsibilities. SMEs are competent in ensuring that storyboard is designed in an attractive way which also makes learning easier and better. According to the administrator interviews, subject matter experts' major role is to decide on interaction activities to be used in storyboard. Finally, even though SMEs are in the core of storyboard production process, in our context they are not fully competent in producing the final material out of the storyboard. That is why our production model is designed in a way that they would constantly cooperate and collaborate with the team of experts in using the software, graphic design, and publishing the materials. According to the findings, subject matter experts' key roles include enabling this cooperation and collaboration. This means SMEs are expected to guide the production team and give and take continuous feedback throughout the process of fitting the course content into the storyboard templates.

4.3 Technology

According to the findings, the third theme is technology, in which policy makers or administrators make decisions as to *by which* technology to proceed with the production work. One of the most strategic decisions was the selection of which software would be used to cater for our needs. These needs that played a crucial role in the selection of the software are the suitability of it to producing a large number of e-courses rapidly. Rapid production was a significant factor for the context since the administration was determined to present the supplementary materials that they had long been demanding to the learners. Apart from rapid production, other expectations from the software were its being user-friendly, output qualities such as HTML5, mobile-adaptiveness, responsiveness to various media, cost and file size.

The majority of SMEs reported that they preferred PowerPoint as a medium for designing the storyboard because of being more convenient for visualisation and animation, more practical and easy to use, and more familiar to them rather than using MS Word. A suggestion that came from one of the SMEs was the need for the use of storyboards in a Web 2.0 environment, which would serve the purpose of collaborative online work of SMEs and production team.

4.4 Content Management

According to the findings, the fourth theme is content management, in which SMEs make decisions as to *which and how* content will be structured. Certain aspects of content management were pre-described for the SMEs but our focus was to explore their experiences on these aspects. These are first of all the structuring of content based on unit objectives and later unit summaries. Two opposing views came out from subject

matter experts about the structuring the contents based on unit objectives. Some of the SMEs expressed their discontent with this structuring as they found it artificial, mechanical, and limiting their creativity. They also found it problematic since the unit objectives were not well defined and not embracing the parts of unit content. In such cases, one of them chose to restructure the content. On the other hand, the majority of SMEs mentioned having a more positive experience with the structuring the contents based on unit objectives. They found that it led the content to be more clear, compact, organised, planned, and holistic. Additionally, one SME reported that this structuring ensured the e-course to be in a parallel structure with the unit content, which enabled the learners to study more regularly.

The limitations on content length and practicality of design in e-course have been two major factors why we asked the SMEs to produce a summary of unit content first and then to design the storyboard based on this summary. Accordingly, the majority of SMEs agreed that the structuring of storyboard based on unit summaries made the job easier and more practical, saved time and planned the design process better. However, some of SMEs commented that they were dissatisfied with this structure as it was more time consuming and limiting. One recommended that coursebook be used together with the summary not to lose the broad perspective of the unit content.

The main problem shared by the production team about content management is length of the text of slides in storyboards. The expectation of the production team regarding the length based on the limitation of design was not expressed clearly by the administrators at the beginning of the process. Rather, vague limits were put to leave the decision with the SMEs. However, our findings revealed that this made the production team's job more difficult as they founded more challenging to visualize the texts when they are too long. Their solutions to this were showing suitable examples to the SMEs, using popups and hot spots to shorten the length, and increasing the number of slides. All these solutions were brought in communication and collaboration with the SMEs, which in time improved the experience of SMEs. As an example to these solutions, when voiceover texts are longer than the requirements of the design, members of the production team cut them and used the cut parts on the slides.

There were also cases where it wasn't possible to shorten the content with the above mentioned solutions. In such cases, the production team members had to take out some of the content to make it shorter. However they checked with the SMEs first. The same was true for punctuation and spelling corrections.

The most commonly used interaction activity by SMEs were popups. There are many reasons shared by them why they mostly used popups which are to shorten the slide content, to give additional information, to give examples, to explain the exceptions and to make the voiceover texts to be visible on the screen. In addition, they also mentioned that popups were more user friendly, attractive and interesting and less tiring for the learner. Another interaction activity available to them was ordering which they misunderstood and misused. Instead of an interaction activity, SMEs used ordering to itemize the content. Drag-and-drop was another alternative given to them

though they never used it. Overall, although SMEs were open to use interaction activities, they explained the reason for not using the other interaction activities as not being informed enough and not being compulsory.

4.5 Visual Design

According to the findings, the fifth theme is visual management, in which SMEs and production team make decisions as to *which and how* content will be visualized. SMEs generally agreed that their use of visuals was sufficient. Some of them were personally excited and enthusiastic about this experience especially because today's generation is more apt to a visual content. In the selection of visuals, most participants told us that they were guided by the production team. In contrast, other SMEs shared negative experiences related to visualizing such as increasing the work load, incompatibility of the unit content, and insufficient knowledge of visual search. Because of the capabilities of interface and flat design which is based on illustrations, the SMEs were asked not to use authentic photographs and videos in their storyboard, which made it more difficult to choose the suitable visuals and caused the SMEs to use the similar visuals repeatedly.

While evaluating their visual use, SMEs also mentioned their experiences with the visual archive as a variable to their evaluation. For our content writers, a visual archive formed by Anadolu Üniversitesi was available to use in e-learning materials. Although this archive could be considered rich with about 70.000 visuals; to select the most appropriate one requires a certain skill, experience, and time. The archive was also found limited and insufficient in terms of scope. This is why some SMEs expressed their concerns about the quality of their visual selection.

Apart from selection, the compatibility of visuals with content was another problem emerged in the visual design process. When the production team evaluated this problem they reported that the visuals suggested by the SMEs were largely incompatible with the content. Although this changed depending on the subject area of the content, generally the compatibility was found insufficient. According the principles of design, flat design based interface requires visuals to be in unity with each other. Unity, which is defined as the elements in a design to belong together in one piece by Galitz (2007), requires all features to be in similar shapes, colours, sizes, and spaces. The production team reported the lack of unity because of inexperience of SMEs, their use of photographs and unlike colors. As a solution, this problem they gave feedback and provided SMEs with sample visuals, and sometimes they found a better visual themselves. Especially the graphic designers in the production team claimed that the insufficient visual selection and incompatibility with content caused them to change most of the visuals with better ones. When deciding on what to change or how to change it, production team considered two aspects which are the subject-dependent scope of the archive, and their personal familiarity with the content.

4.6 Perception of SMEs

The perceptions of SMEs on the effects of e-course and its components on learning determine their experiences and the attitudes towards storyboarding. Subject matter experts (SMEs) who participated in the process mentioned the qualities of e-course such as being mobile, making learning fun, making retention longer through visuals, animations and real-life situations, saving time for students with limited time as factors leading to better learning. Regarding the link between the coursebook and the e-course material, they implied that e-course is crucial for guiding the learners about the structure of the coursebook through summarizing it, as well as leading to higher academic success when used together with the book. This means administrators and SMEs have a contradicting opinion regarding the relationship between the book and the e-course designed to complement the book.

Our findings revealed that the SMEs have a positive attitude towards the effects of visuals on learning as they thought they made the e-course attractive and suitable for the learner profile of the new generation. Besides, for them e-course leads to continuous interest and retention, and addresses different senses.

SMEs have a positive attitude towards the use of animations although only one of them actually benefited from it. Apart from attractiveness and retention also mentioned above, animations were reported to make the e-course more enjoyable and holistic. One of the participants was so enthusiastic about animations that s/he recommended animations be used across the whole unit.

While only two types of interaction activities were largely used by SMEs, they generally perceive them as breaking the monotony of the e-course, keeping the learner active and attracting his/her attention fully.

4.7 Quality Assurance

Quality assurance is both the stage where the structure of the storyboard is determined and the process is continuously assessed. This theme reveals us what our participants view as factors affecting the quality of the e-course output. The most prominent of these factors taken out of the data was those pertaining to the form of the e-course such as the use of visuals, being entertaining and attractive. Visuals and other tools to make an e-course attractive were reported to be crucial in its quality but some participants also underlined their worries about the material being distractive due to the overuse of interactions and visuals. In terms of content, the quality was reported to be determined according to whether the material included sufficient amount of authentic examples, which was believed to make learning easier. Another factor reported to be crucial was the extent of the material to be able to address different learning styles. Finally, administrators mentioned the sustainability of the e-course as an important factor leading to the long term continuity of the production.

To assure quality, administrative strategy was determined that teamwork would be the key aspect of the production process. The e-learning production process is a collaborative process in which each member does his or her own specific tasks for a

course (Khan, p. 4, 2004). For SMEs, there was teamwork in this process among themselves, the production team, the production coordinators and even the content writer. As to the communication and cooperation among these, meetings and regulations set at the beginning of the process made them less anxious; so they were able to contact the others in the team when necessary, as they worked at different buildings of the campus and had their own timetables. As Jones (2008) reported, storyboards might lend themselves as a medium of ideas for geographically disparate design teams like this.

The fact that SMEs and those in the production team are not equals in terms of title and position determined the nature of communication and teamwork for some of SMEs who were unwilling to cooperate. This might be because in the Turkish culture asking your peers' advice is more likely than asking your inferior's advice. Likewise, the production team hesitated to contact the SME in some cases as they thought they were closed to communication, didn't get back to their calls or e-mails and didn't show up to the designated working times. As a solution to this, they contacted the production coordinator directly and asked him to contact the SME, or tried to reach a different SME and refer to the coursebook. Likewise, the SMEs who were formerly acquainted with the production coordinator felt more at ease to contact him/her. As for communication and collaboration within the production team, there was continuous cooperation, brainstorming and exchange of ideas. Their spatial proximity gave way to this exchange and teamwork. SMEs recommended that interaction between these two groups be more planned and periodically defined.

Despite the stress that some SMEs put on the issue of equivalence of parts in the teamwork, administrators viewed production team as the key element of the production process. According to them, the duties and responsibilities of the production team are to be able to manage the production and cooperation processes, coach and mentor the SMEs and follow the revisions. Quality assurance must include the learner as well as a stakeholder of the e-course material. This emerged as a central finding about the measurement of the effectiveness of the e-course material.

4.8 Learned Lessons

Subject matter experts that were chosen to participate in the production process were mostly inexperienced and novice in storyboarding, which led them to be a little anxious about it. Both time and continuous communication with the production team boasted the quality of their contributions. Since field experts usually have no technical background, we must facilitate their task as much as possible. Otherwise, their attention shifts away from what really matters: their knowledge of the field (Moreno-Ger, Burgos, Martínez-Ortiz, Sierra, and Fernández-Manjón, 2008). Probably not to shift their attention from it, none but one SME came up with an animation scenario. When asked the reasons for not using animations, SMEs said that it was challenging and time consuming for them as they had neither knowledge nor experience on animations. One SME reported that she was able to produce one because of her personal curiosity and

development, and with the help of the production team members, who suggested that the process should be planned in a way that all SMEs must be competent in animations and in other limits and capabilities of the software from start. Apart from animations, SMEs also needed expertise and support in instructional design. Data revealed that SMEs generally would create definitely better products if they had support in issues like learning theories and design principles in distance education, and the properties of the target group of learners in our context.

A central suggestion pertaining to all problems experienced throughout the process by all three groups of participants was related to the training of SMEs. first of all, although there were a couple of meetings at the beginning, all groups agreed that a training should be planned on storyboarding, which would define the roles of SMEs clearly and our expectations from them. For example, the length of voiceover texts, the number of interaction activities and animations to be used, the format of visuals must be pre-defined and clearly announced to the SMEs. This training was also recommended by SMEs that it include the principles of design in e-course, and the limits and capabilities of the software by administrators and the production team. As mentioned above, both SMEs and the members of the production team also suggested that this training should also include a sneak-peak of distance education learning theories and e-course design principles.

Secondly, findings show that evaluation must be a key issue in e-course. Although quality assurance was a continuous aspect of the process, SMEs suggested that learners should actively participate in the final evaluation of the e-courses produced during this process. Production team was rather concerned with the last quality check of the material before it is transformed into an e-course as there were problems with the intonation and punctuation of voiceover texts, which they thought to reduce the quality of e-course.

Last but not the least, the production team and the SMEs both suggested that the communication between them should be more regularly planned and given designated time slots so that both parties would not have problems contacting each other, which would improve the quality of team work and the collaboration within the team.

In a similar study aiming to investigate the cognitive task and skills required of SMEs, six guidelines emerged that are considered as e-learning storyboard components: effective medium communication, well-informed multimedia components, well-structured storyboard design patterns, embedded (built-in) training, automated problem solving and decision making. (Yusoff and Salim, 2012) Although in our case not the cognitive skills of SMEs but their central roles as storyboard producers were assessed, it is interesting to see that in both studies the significance of communication, a clearly structured and well-defined teamwork, and a built-in training component are key issues.

5. Conclusion

As part of material production for the Anadolu University Open and Distance Education System, e-courses were produced for nine most populated courses in a six month period through the active participation of SMEs in the development and design stages of e-course production process. Storyboard was decided to be used as a medium for them to do this. A team of graphic designer and learning technology experts transformed these storyboard into e-courses, which is the final product that the learners make use of.

This study aimed to analyze the factors leading to production and other strategic decisions from the viewpoint of administrators, the perceptions experiences of SMEs on their of active participation in the development and on the production process generally both from the viewpoint of SMEs and production team works. As the focus of this study is a product for student learning, further studies both aiming to evaluate the extent of the contribution e-courses make to student learning and achievement, and to assess user satisfaction with the product are on the way.

Storyboard, which was defined as an intermediate product that the web developers use to develop the e-learning material by Ghirardini (2011), was used as an intermediate product by subject matter experts in our case with the guidance of production coordinators and in collaboration with a team of e-course production. Storyboard turned out to be an agent for teamwork, a bridge of communication between the SMEs and the production team, a means of planning and structuring the content, and a way to see and revise the final product before production of the e-course. The storyboards were not developed independently but based on the objectives of the relevant course, which had certain advantages such as outlining the content but also drawbacks such as making the storyboard artificial and mechanic in a way that would limit the creativity of SMEs.

Upon consideration of all the themes that emerged out of three groups of interview data, the following suggestions which would contribute substantially to the reconstruction of the production process were made.

1. Roles, responsibilities and expectations to be well defined and clearly structured: In our educational context, a direct need for a better defined and structured development process model that included subject matter experts in the storyboard production process “while maintaining their work independent of any technological requirements” (Moreno-Ger, et. al, p.2, 2008) emerged. Although the production coordinators sent informative e-mails and held meetings to ensure the initiation stage to be successful, there was still a high level of ambiguity and tension in SMEs’ part because of inexperience and unfamiliarity to storyboarding. That is why the roles and responsibilities of SMEs and expectations from them should be very well defined and operationalised at the beginning. This means decisions are to be made as to the

extent, variety, and amount of visuals, interaction activities, animations, and announced clearly to the developer SMEs.

2. The need to train SMEs on the pre-development stage: It was concluded that SMEs would definitely feel more confident and develop higher quality storyboards had they been trained on the capabilities of the software, visual search and use, the principles of design, and lastly on learning theories and approaches specific to open and distance education.
3. Communication and collaboration to be planned on a regular basis and kept alive: The process was designed in a way that storyboard writers and the e-course producers would be in contact with each other so that the SMEs would ask for ideas, examples, and feedback from the production team, and that the production team would ask for revisions and corrections from them. However, some SMEs were not open to contact and continuous communication due to some psychological barriers and not working in a planned way. Thus, we suggest that regular and pre-structured team meetings must be held for SMEs and their counterparts in the production team throughout the process to keep communication alive and ease the tension. Otherwise, it is too hard to call the process as teamwork.

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