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Ferit KILIÇKAYA[76]

INFUSING ACTION MAZES INTO LANGUAGE ASSESSMENT CLASSS USING QUANDARY[77]

Introduction

There have been amazing technological developments both in the industry and the education market and transformed numerous printed materials into digital ones to be used on computers and mobile devices through the Internet (Healey, 2016; Philllips, 2016; Smith, 2016; Otto, 2017). The applications based on behavioristic learning principles have been replaced by more communicative tools benefiting from media, which enables the users and learners to interact with the material rather than learning based on drills and tutorials (Warschauer, 1996). These applications generally fall into two categories: those who focus on gap-filling and multiple-choice activities, and those such as simulations and interactive stories that focus on interaction (Davies, 2010).

Of these tools, action mazes receive much attention due to their nature that focuses on interaction and decision-making processes. Rinvolucri (1980) introduced action mazes as reading and writing activities in which the learners practiced discussion. Moreover, Kennedy (1999) pointed out the role of action mazes in decision-making processes and problem-solving skills and suggested that it should be included in the teacher education programs. As Norris, Davis, and Timple-Laughlin (2017) point out, action mazes are known as tools that assess "learners' higher order abilities (e.g., reasoning, evaluation, decision making)" (p. 231). Action mazes are printed or online descriptions of a story, an issue, or an incident followed by a list of options that allow readers to make decisions and to find out the consequences (Rothwell, Benscoter, King, & King, 2016). In an action maze, the following steps appear:

Readers are given a situation.

Based on the situation, readers are presented with several options. Readers need to consider the information as well as the limitation given in the situation. Readers then select one of the options, and based on the selected option, they are directed to a new situation, which is called a decision point.

Readers continue reading the situations and options until they come to a good decision. The following is an example of a typical action maze in which readers are provided with a situation and a list of options to select (Figure 1):

1. THE SITUATION

Your company employs sales representatives /reps who visit customers /clients personally, and there is also a team of salesmen who work over the phone, selling on a commission basis. You have recently been put in charge / become the head of the telephone sales staff.
You have heard that the company has suffered from staff problems, especially in the telephones sales department.
It is hard to find new qualified / trained staff there.

1
One day you are astonished / surprised when John Miles, one of your team's best salesmen, has refused to go to a departmental meeting.
He has given no reason for this.
It is normal practise for everyone to go to such meetings, so what are you going to do about John?
Discuss with your partner first and choose A,B,C, or D below. Then turn only to the section number given. Do not read other sections.

A Insist that he goes as it is compulsory / obligatory for everybody, and you don't want to make any exceptions. (3)

B Ask his friends in the sales team why he has refused to go. (10)

C Ask your immediate superior / boss what normal practice is in such situations. (18)

D Leave him alone to make his own decision, don't interfere with this decision. (6)

Figure 1. An example of an action maze ("An Old Exercise", 2005)

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[76] Assoc. Prof. Dr., Mehmet Akif Ersoy University, ferit.kilickaya@gmail.com
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In this action maze, readers are provided with a situation in which they have to decide on what to with one of the best salesmen in their company, who refuses to go to a departmental meeting. When readers select on option (for example, D), they are directed into a new decision point where there will be new information regarding the decision made. Each time readers make a choice, the situation unfolds further. The action mazes can be created on word-processing software and presented as cards to learners. However, it might not be cost-effective, as it will require pages of print materials. Therefore, authoring tools might be of benefit in this case.

Quandary is among the authoring tools that enable creating action mazes. *Quandary*, available at http://www.halfbakedsoftware.com/quandary.php, is a freely available piece of software that enables users to various types of interactive situations such as diagnostics and procedural training as well as interactive case studies (Dudeney & Hockly, 2007; Armitage et al., 2012). The software was developed by Stewart Arneil and Martin Holmes at the University of Victoria Humanities Computing and Media Centre, and is distributed as freeware by Half-Baked Software and the University. The software does not require any kind of technical knowledge or programming skills, though understanding several functions and adding links is required, which can be easily handled through the help files and the tutorials provided by the software on the basic features and functions. Examples of various action mazes created with *Quandary* can be found at http://www.halfbakedsoftware.com/quandary/version_2/examples/.

The studies conducted on the use of action mazes in education are very limited. Few studies investigated the use of action mazes. To the best knowledge of the author, there is little research conducted on the language learners' perceptions towards infusing action mazes into the classroom and the emerging issues. For example, Todd and Tepsuriwong (2008) investigated the use of mobile-based action mazes in the language classroom. The study used an action maze based on a story delivered through mobile phones and obtained the participants' views on several factors such as content, skills, and the software itself. The findings revealed that the mobile-based action mazes were received positively by the participants and that the participants learnt English from the story regarding vocabulary and reading. The other study that suggested using an activity benefiting from action mazes in teaching pragmatics was authored by Salsbury (n.d.). The activity aimed to explain the stages to teach learners how to select requests by identifying pragmatically appropriate language, along with Salsbury's comments on how it worked in his own teaching contexts.

The other studies available, though few, focus on the use of action mazes in the fields of law and medicine. For example, the study conducted by Gilbert and Priddle (2010) utilized action mazes and multimedia technology to enable family law students to improve their problem-solving skills in finding solution to issues on family law. Based the participants' responses, the study indicated that the use of action mazes developed their problem-solving skills and provided them with active learning that enhanced their experience. In another study conducted by Waights (2009), nursing students were provided with situations in which they had to decide on the options based on the information provided regarding patients' health. The results indicated that their decision-making skills improved after using and responding to the situations and that these situations helped them get prepared for their practice.

As the previous studies indicate, problem-solving is one of today's prominent skills and is an ongoing activity where learners are actively involved in seeking information, generating new knowledge based on this information and making decisions accordingly. In this respective, through infusing problem-solving into curriculum of language teaching, it might be possible to help students have responsibility for their own learning and learn a variety of ways to take personal actions to solve problems. In addition, problem-solving enables learners to link new knowledge with the real-life activities, leading to higher levels of thinking. Therefore, the current study aims to encourage learners to utilize problem-solving skills through *Quandary*, an application used to create web-based action mazes.

Materials and methods

Research Design

This study is an instrumental qualitative case study (Creswell, 2012) on a small sample of English as a Foreign Language (FL) students, which benefited from integrating problem-solving and web-based action mazes into the language assessment classroom. The aim of the study is to draw some useful indications as well as methodological guidance for further research to be conducted on a larger scale in order to contribute to utilizing problem-solving skills as well as web-based action mazes, specifically in language assessment class in teacher education programs.

Participants

The participants included sixty-four students majoring in English language teaching at the Department of Foreign Language Education at a state university in Turkey. Of the participants, 52 were female, while 12 were male and average age was 22.5. The average years of leaning English was determined to be 11.6. All the participants learned English as a FL except three students, who acquired English in a school or country where the medium of instruction was English.

Materials used

Quandary was used by the participants to create web-based action mazes (Figure 2). The participants were asked to create two situations based on a topic discussed up to the final exam, in which the readers of the situation would select a number of choices based on the situation presented. The topics on which the situations were created were to be selected from the main course book "Language Assessment: Principles and Classroom Practices", written by Brown and Abeywickrama (2010). The aim of the course was to teach students how to write, implement, and evaluate a variety of testing instruments for a specific group of language learners. It is, in fact, a content course that reviews the basic concepts, strategies, and principles such as varieties of tests, test validity, and reliability, stages of test construction. The course follows an integrated approach that also reviews assessing individual skills (e.g., writing, reading, listening, speaking).

Data collection and analysis

Semi-structured interviews were conducted to determine the participants' views on creation of action mazes for the topics related to language assessment, and the data collected were subject to content analysis. The interviews were conducted in the researcher's office after the final exams were over and the final grades were submitted to the registrar's office so as not to affect the participants' views. One student was randomly selected from each group, and thirteen students were interviewed in total. The interviews lasted twenty minutes on average. The following set of questions was directed towards the participants. However, depending on the flow of the interview as well as the responses provided, several other issues were also discussed such as peer feedback and motivation.

Was the software easy / difficult to use? Why?

Did you like to work in groups while working on the situations? Why (not)?

Was the feedback provided by the other groups / researcher useful? Why (not)?

What were the advantages / disadvantages of creating action mazes?

Do you think that creating and reading action mazes created in this classroom contribute to your problem-solving skills? Why (not)?

The data collected through the interviews with thirteen participants were subject to content analysis. The interviews were transcribed verbatim, which was followed by the analysis process in which themes and codes were analyzed and determined. The themes and the codes as well as the example responses have been provided in Table 2.
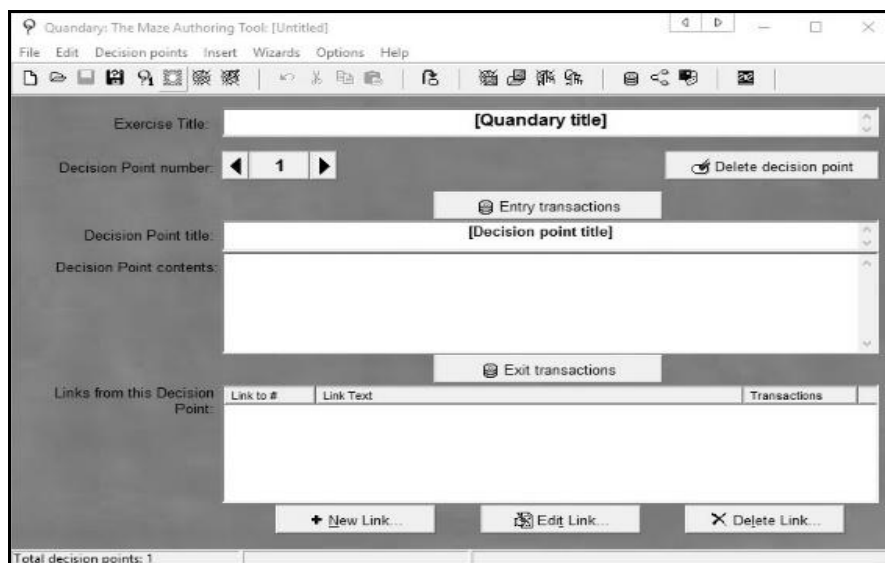

Figure 2. Main interface of Quandary

Procedure

All the participants were enrolled in the foreign language testing and evaluation course offered at the department of foreign language education. The participants were informed about the general aim of the study without going into details, and their consent was obtained. They were informed that the tasks that they would perform during the study would be taken into consideration in the final exam and affect the final score by 15 per cent. Several topics regarding language assessment were included in the study (Table 1).

Table 1. Topics to be selected by the participants

Week	Topics	Source
Week 1	Introduction Assessment concepts and issues	Course policy Chapter 1
Week 2	Assessment concepts and issues (cont.)	Chapter 1
Week 3	Principles of Language Assessment	Chapter 2
Week 4	Designing Classroom Language Tests	Chapter 3
Week 5	Standardized Testing Basic Statistics	Chapter 5 Handout
Week 6	Basic Statistics (continued) Assessing Grammar and Vocabulary	Handout Chapter 11
Week 7	Assessing Speaking	Chapter 8

During the first week, after the class when the participants were free, they were provided with hands-on experience on the use of the software. The training lasted three hours, and included a practice session where the participants created a simple action maze to learn the basic features of the software. The participants were informed that they would create a situation related to language assessment and evaluation, together with a number of choices to select. Each resulting situation was presented again with a set of options, leading to a kind of interactive case study where the reader was asked to decide and make decisions based on the presented information. After the training, the participants were asked to form groups of five to six. In total, thirteen groups were formed. Each group included five participants, while there was only one group included four participants. The participants were free to select any two topics discussed in the class and were asked to upload their draft of action mazes to the class website. The participants were required to work together and strengthen their critical thinking skills, as Laurillard (2002) indicated that education should also enable students to develop as independent learners that will improve themselves without the direct help provided by the teachers. Thus, working in groups on their situations, the students were in charge of their own learning and at the same time, they had to cooperate with each other so that they could find the best way to present their situations on language assessment. When the draft mazes were completed and uploaded to the website, the groups were asked to provide feedback to at least two groups' work regarding the situation created, whether the situations and options encourage critical thinking as well as the options provided. Based on the feedback provided, the groups finalized their draft and after the final exam, the interviews were conducted on the participants' perceptions regarding the process as well as the product. An example situation and options created by one of the groups is provided in Figures 3 and 4.
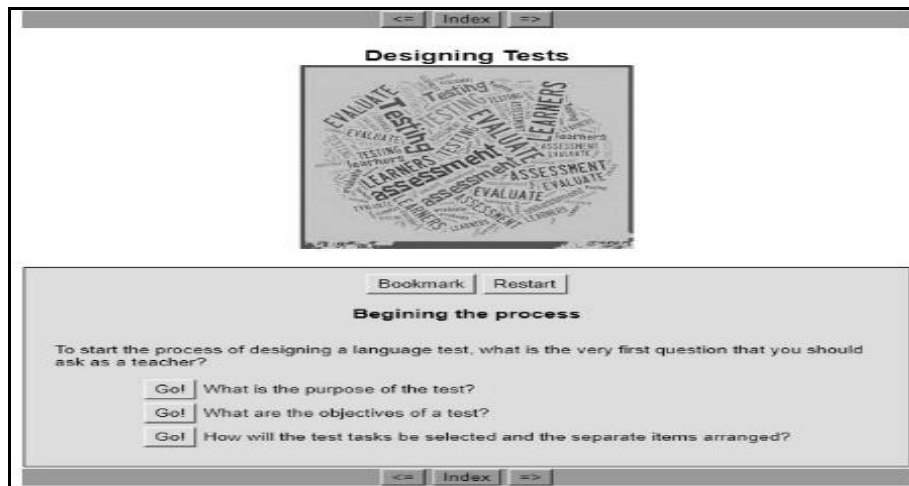
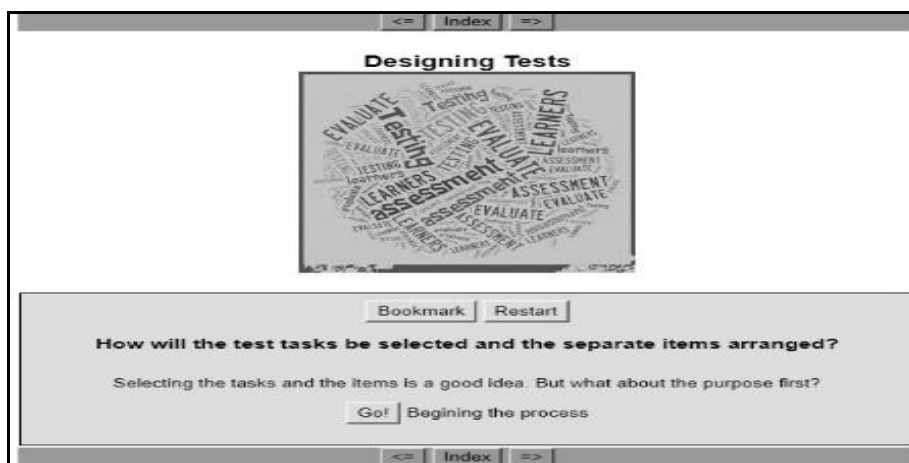Figure 3. The main page of an action maze created by one of the groups

Figure 4. The feedback provided based on the option selected

Results

Based on the responses provided by the participants during the interviews, it was determined that creating and reading action mazes regarding language assessment was received positively. Of the 13 participants, 12 were positive about using action mazes. The results are discussed below under each theme and the corresponding codes. Moreover, the quotes selected are most representative of the research findings, which must be understood in relation to the context of the study conducted.

Software. Under this theme, two codes emerged: complex and not user friendly. The participants (n=10) expressed that they found the software rather complex and unfriendly, especially when creating the decision points in the action mazes. Three participants were neutral about the use of the software. One of the participants expressed his/her experience as follows:

> *"Creating decisions points appeared difficult to me. Although I practiced this during the training sessions, I found it rather complex in the group work. Therefore, we asked one of us in the group, whose computer skills were better compared to us, to do the job. The software could have been more user-friendly by providing a simpler process of creating the action mazes. (Participant 4, Female).*

Group work. This theme included two codes: free riders and time management. Creating action mazes was rather a difficult work for the participants due to several reasons. 8 of the participants complained that there were free riders in the group, who did not equally contribute to the group work. These participants complained that some of the group members provided excuses for the group meetings and did not appear in some of the meetings. It might be argued that in most cases group work proved demotivating:

> *"Actually, I did not like the group work because some of my friends did not contribute to the group work as much as others. One or two group members did not appear in some of our group meetings, and they just wanted to contribute to the work by typing the action mazes. This actually made the group work an unpleasant experience for most of us. I believe that I could have done much better if I had worked alone."* (Participant 10, Male)

Regarding the time management, 10 participants expressed that they had difficulty in arranging the time as well as the place for the group meetings. These participants expressed that some of their group members were staying in the dormitory on the campus, while the others preferred the flats for their accommodation in the city center. Therefore, they indicated that the task of planning time and place was a challenging factor in the group work:

> *"It was really difficulty to find the best time and the place for the group members to come together. Two group members were staying in the dormitory, which is far away from the city center where other two members were staying in a flat. We tried to come together after the class in the canteen, but most of the time it was very crowded and noisy, which made it impossible to concentrate."* (Participant 20, Female)

Feedback. Under this theme, only one code appeared: peer feedback. As elucidated before, during the study the participants were asked to provide feedback to each other's work. It was aimed to improve the participants' both understanding of course materials and to ensure that their ideas and strategies were also taken into consideration. However, most of the participants (n=11) stated that the feedback provided by their

classmates, in other words, the peer feedback, was not detailed and that they preferred teacher feedback regarding their work. One of the participants pointed out the main disadvantage of receiving peer feedback:

> *"I think it was a good idea to provide feedback to our classmates' work as it also required us to read the mazes critically and then provide comments. However, as far as I see, it simply did not work. Except the comments provided by few students, the comments were not in detail, and it lacked, most of the time, criticisms as well as the suggestions."* (Participant 30, Female).

Action maze. This theme included four codes: Creativity, problem-solving, motivation, and content learning. The participants were directed open-ended questions regarding the use of action maze as well as the production stage and asked to share their experiences and views on the advantages and disadvantages. One of the most common factor stated as a merit of action mazes was to uncover the participants' creativity. All the participants were of the opinion that creating action mazes led them to find creative ways of providing a situation and related options:

> *"Thinking about a possible situation and related decision points was really challenging for us. I was very surprised to see how some of our silent classmates came up with uncommon ideas and options. Some of them were interesting. I think creating an action maze makes students discover their hidden talents."* (Participant 20, Male).

Another common advantage of action mazes was their contribution to problem-solving skills. A great majority of the participants (n=9) acknowledged how creating and reading action mazes encouraged them to be involved in the information presented in the situations, and use this information as well as their own schemata to make the most suitable decisions. According to the participants, action mazes led them to 'think' about the given situation, which is an important element in any educational context. One of the participants explained this as follows:

> *"While I was reading the action mazes, I first thought about the situation and the information provided. Then, I made a decision and selected an option, which led me to a new situation. It was like solving a problem, moving slowly to the final step to find the solution. The situations I read did not ask for only factual information to recall but to think critically and then to make a decision."* (Participant 43, Female).

Another participant expressed that action mazes closely resembled crossword puzzles in that reading each situation and making decisions was similar to writing the answers to questions in a pattern of numbered boxes. As this participant expressed, "It somewhat encouraged me to use my problem-solving skills." (Participant 60, Male).

A great majority of the participants (n=10) expressed that they found action mazes interesting and motivating. To most of them, reading the situations, selecting the options, and moving on to another situation provided them with a gaming experience and encouraged them to 'finish the game'. Although the participants acknowledged that action mazes were not as entertaining as computer games, they were eager to learn what would happen when they selected a different decision point. One of the participants expressed this as follows:

> *"Reading actions mazes was similar to playing games to me. It is not playing a computer game at home and it does not provide the same level of entertainment, but I felt motivated to read more and check the other options to learn what would happen next. I mean I think it was enjoyable for me."* (Participant 10, Male).

Almost all of the participants (n=12) highly valued the way action mazes provided them with the opportunity to determine their strengths and weaknesses in terms of the course content. Although the participants were free to select the topic on which they would base their action mazes, there appeared a wide range of issues investigated in the mazes such as helping a teacher to make his/her classroom tests more reliable and valid. The participants believed that action mazes also contributed to learning the content:

> *"While creating and reading the action mazes, I found myself recycling what I learned. For example, when I was doing the action maze related to assessing grammar, I was asked to help a teacher who cannot decide whether the classroom assessment should be done through selected-response or open-ended questions. I always thought that selected-response questions were better compared to other assessment types, but as I selected the options, I learnt various advantages of using other types. I think this also helped me to learn the course content that I missed. Moreover, I also recycled the concepts and strategies that I learnt."* (Participant 62, Female).

Table 2. The themes and codes that emerged from the responses provided during the interviews

Theme	Code	Sample Response
Software	Complex	*"The software was a little bit complex I think. I learnt the basic functions and features in the training session, but I had to check many times how to do the things such as creating a decision point. I do not know. It might be because I did not use something similar before."*

	Not user friendly	*"The software could have been more user-friendly. I mean, the situations can be created on the same page together with the options. For each option, I had to repeat the same procedure but sometimes I got lost."*
Group work	Free riders	*"We had some group members who did not help us in the work. As I was more knowledgeable in terms of computers and although the software did not require any technical skills, some of the group members left much of the work to me."*
	Time management	*"It was generally very difficult for the group members to arrange the time as well as the place to come together. Whenever we tried to come together, one of the group members was absent due to several reasons. I think individual work would lead to better results."*
Feedback	Peer feedback	*"Much of the feedback provided by other groups was superficial. Some of the responses were "I like it", and "It should be improved". I was expecting more content-related feedback on what points should be improved. I mean the feedback should be in detail."*
Action maze	Creativity	*"Creating an action maze really lends itself to creativity. Of course, we benefited from what we have read from the book as well as the classroom discussions. However, creating the options for each situation forced us to think and discuss the ideas and make a decision. We had very interesting ideas from our friends."*
	Problem-solving	"While creating our own situations and reading other group members' work, we practiced evaluating the problem or the situation and making decisions. In order to do that, we had to consider what we learned in the class, to carefully analyze the possible courses and to select the best solution.
	Motivation	*"I think this task was very facilitating. I mean we liked creating and reading situations, and options, which led us to a different decision-making point. The situations enabled us to see how the content was related to real-life or the classrooms that we would be teaching in the future."*
	Content learning	"Creating and reading the situations enabled me to review the content. Moreover, when I did not know the term in any decision point, I checked the lecture notes and the book to learn or sometimes refresh my knowledge."

Discussion

The discussion on the findings of the study is fairly impressionistic and based on the subjective responses of the participants. Investigating the use of action mazes in a content class at the tertiary level, the current study suggests that using action mazes provides the participants with the opportunity to focus on the content communicatively. The participants voiced several advantages such as content learning and motivation, which enabled them to gain exposure to the situations in which language related issues were represented. The findings of the study reveal that the software used to create action mazes, *Quandary*, was found to be rather complex. A hands-on experience was provided to the participants at the beginning of the study. Although the participants did not raise a major issue regarding the training, it is possible that they could not practice using the features of the software. Therefore, the participants could have been provided more training. Moreover, the participants needed a dedicated computer and software to create the mazes. Instead of using a special piece of software to be installed on a computer, the participants could have been provided with a web-based action maze authoring tool, which would enable them to access it from any electronic device.

The participants voiced concerns regarding the group work. Although the study did not aim to discuss the effects of group work in the use of action mazes, the responses provided raised group work as an important concern. The participants complained that there were some group members, free riders, who did not contribute as much as the other members did, which corroborates the findings of the study conducted by Kilickaya (2017).

Moreover, it was also claimed that group work activities made it hard to work together as it was difficult to arrange time and place that suits every member in the group. Therefore, the participants preferred working alone to working in groups. This might be attributed to the fact that the participants spent years in an educational context where individual success at nation-wide exams were and are still important and that they did not know how to cooperate while doing the projects. Further research can both implement individual and group work in addition to some measures to be taken such as asking the participants to keep records of meetings as well as peer assessment of group members.

Feedback appeared to be another important theme in the responses analyzed. It was aimed to create awareness of the others' work as well as to consider their own ideas and suggestions. Although a rubric was provided to the students to assess the action mazes, the responses indicated that the peer feedback provided on their projects were found not to be detailed and sufficient to make necessary changes and revisions. This might have resulted from the low score assigned to the peer feedback to be provided by the groups and the lack of ability to give peer feedback due to insufficient knowledge and practice. Moreover, as the participants did not exploit giving peer assessment much in their previous educational contexts as well as the current one, the results indicated that they needed more training and practice in giving peer feedback.

The last theme that emerged as one of the key findings of this study concerns the creating and use of action mazes. The participants attributed a number of features to the use of action mazes such as creativity and problem-solving. As the participants created the action mazes in class, they used not only the information in the coursebook and the lecture notes but also created their own scenarios based on this information. This, most probably, brought their creativity to the forefront, in addition to using the previously-learnt items in the class. In addition to their use of creativity, the participants also expressed that problem-solving skills were enhanced during creating and reading the action mazes, as they had to make the best decisions based on the situations, which is in line with the findings of the studies conducted by Gilbert and Priddle (2010) and Waights (2009). These two factors, creativity and problem-solving, together with the game-like nature of action mazes, also led the participants to be motivated. One reason might be that action mazes are more interactive compared to other Computer Assisted Language Learning (CALL) applications that utilize drills and tutorials that focus on specific linguistic forms, which are considered in the behavioristic phase of Warschauer's (1996) categorization. Thus, the action mazes provide an incentive for the participants to be interested in the situations and the decision points. The communicative nature of action mazes, especially, make the participants interested and motivated, which is in line with the study conducted by Todd and Tepsuriwong (2008). In addition to being interesting and motivating, the action mazes in this study enabled the participants to focus on the content covered in the course content as well as the lecture notes. As the action mazes were based on the content, the participants had the opportunity to review and recycle the topics, which made it possible for them to determine their strengths and weaknesses.

The data collected through the qualitative analysis suggest that action mazes can be an interactive and communicative way of providing students with a game-like experience for content learning at the tertiary level. Although the readers may decide that the research findings and conclusions from this study conducted through purposive sampling may not be generalizable to the whole population, they might consider the following implications so that they can make connection between these implications and their own practice and decide if they can enhance the learning experience:

Creating action mazes and their pedagogical uses can be infused into teacher education programs so that prospective teachers should be informed about its pedagogical uses in such CALL courses as offered by Akayoğlu (2017).

Action mazes can affect the way the learners use the information included in the course content and lecture notes interactively and communicatively. Thus, learners can create their own mazes, which can be used for writing and discussion activities in addition to reading ones. Although action mazes were used at the tertiary level in the current study, readers might would like to try them in their own contexts such as secondary and high schools in the courses where creativity and problem-solving skills are targeted. Action mazes can be assigned to groups or pairs. However, it is due to note that teachers should make sure each learner contributes to work equally. As creating action mazes might require time and efforts, it should be borne in mind that their use can be planned as a semester project. In this way, learners can be allowed ample time to allocate necessary brainstorming, planning, and organization. Moreover, the current study benefited from *Quandary*, a freely available piece of software to be installed on a computer. Although it required no programming skills or knowledge of codes, the participants expressed the need for further practice with it. Therefore, readers planning to use the software in the classroom are advised to provide ample practice and sufficient training before learners start creating action mazes.

Conclusion and suggestions for further research

Based on the interviews conducted with the participants, it was determined that the participants improved their problem-solving skills and linked the content of the course with situations. Moreover, the results indicated that *Quandary* has proven to be an interesting means to stimulate the participants' motivation as well as curiosity and interest. As this study was conducted only in one class, foreign language testing and evaluation course, it requires more in-depth investigation. Further research is needed in order to draw reliable and valid conclusions regarding the use of action mazes in order to promote problem-solving skills. Other faculty members can implement the use of action mazes in their classrooms to better understand its effects on various factors such as achievement, motivation, and creativity. Moreover, instead of asking the learners to create their own mazes, pre-made action mazes can also be used, and discussions on the action mazes can be held in the class.

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Eylem BAYIR
Doç. Dr. Trakya Üniversitesi, Eğitim Fakültesi, Fen Bilgisi Eğitimi ABD 22100, Edirne-TURKEY.
E-Posta: eylembudak76@gmail.com
Edirne-Keşan'da 1976'da doğdu. İlk ve ortaokulu Keşan'da tamamladıktan sonra liseyi Edirne'de okudu. Lisans, yüksek lisans ve doktorasını sırasıyla 1998, 2001 ve 2009 yıllarında Gazi Üniversitesi Gazi Eğitim Fakültesi Kimya Eğitimi ABD'nda tamamladı. Aynı anabilim dalında 1999-2009 yılları arasında araştırma görevlisi olarak çalıştı. 2009-20015 yılları arasında Trakya Üniversitesi Eğitim Fakültesi Fen Bilgisi Eğitimi ABD'da Yrd. Doç. olarak görev yaptı. Aynı anabilim dalında 2015 yılından beri doçent olarak görev yapmaktadır. İlgi alanları fen eğitimi, kimya eğitimi, yapılandırıcı yaklaşım, bilimin doğası, STEM eğitimidir.

Ezgi AKŞİN YAVUZ
Yrd. Doç. Dr. Trakya Üniversitesi Eğitim Fakültesi
1988 Niğde doğumludur. Marmara Üniversitesi Eğitim Fakültesi Okul Öncesi Eğitimi ABD'ndan 2010 yılında mezun oldu. Marmara Üniversitesi Eğitim Bil. Enst. Okul Öncesi Öğretmenliği Bilim Dalı'nda 2013 yılında yüksek lisans, 2016'da da doktora eğitimini tamamladı. 2010-2011 yılları arasında Milli Eğitim Bakanlığı bünyesinde yer alan bir anasınıfında kadrolu öğretmen olarak görev yaptı. 2011 yılında Öğretim Üyesi Yetiştirme Programı ile Trakya Üniversitesi Eğitim Fakültesi Okul Öncesi Eğitimi ABD'nda araştırma görevlisi olarak göreve başladı. Çalışmalarına okul öncesi dönem çocuklarının bilişsel işlevlerini uygulaması, dinamik değerlendirme yaklaşımı ve okul olgunluğu üzerine devam etmekte olan Dr. Akşin-Yavuz'un ulusal ve uluslararası pek çok çalışması bulunmaktadır. Halen Trakya Üniversitesi Eğitim Fakültesi Okul Öncesi Eğitimi ABD'nda öğretim üyesi olarak çalışmaktadır.

Ferit KILIÇKAYA
Assoc. Prof. Dr. Mehmet Akif Ersoy University, Faculty of Education, Department of Foreign Language Education,
Burdur-TURKEY.
E-mail: ferit.kilickaya@gmail.com
He was born in Çankırı in 1977. He obtained his B.A. in English Language Teaching from Boğaziçi University (Turkey) in 1999 and M.A and Ph.D. in English Language Teaching from Middle East Technical University in 2005 and 2012 respectively. His main area of interests includes computer-assisted language learning and testing, and educational technology. He has published several articles and reviews in journals such as Educational Studies, British Journal of Educational Technology, and Computer-Assisted Language Learning.

Figen GİRGİN
Researcher Assist. Dr.; Trakya University, Faculty of Education, Art and Crafts Teacher Education 22030, Edirne-TURKEY.
E-mail: fffff_g@hotmail.com
She was born in Edirne in 1984. After completion of his elementary, middle and high school education in Edirne. Then, she obtained her BSc in Art and Crafts Teacher Education from Marmara University (Turkey) in 2006 and her MSc in Social Sciences Institute from Trakya University (Turkey) in 2009. She obtained her PhD in Education Sciences Institute from Marmara University in 2015. She research interests include art education, contemporary art, painting art, reproduction, recreating.

Gökhan ILGAZ
Assist. Prof. Dr.: Trakya University, Faculty of Education 22100, Edirne-TURKEY.
Cell: +90.533.525.93.89
E-mail: gokhani@trakya.edu.tr
He was born in Edirne in 1983. After completion of his elementary, middle and high school education in Edirne. Then, he obtained his BSc in Science Teacher and MA in Curriculum and Instruction from Trakya University (Turkey) in 2004 and 2006 respectively. He obtained his PhD in Science Education from Gazi University in 2011. He worked as an assistant researcher in Trakya University (2005-2010) and Gazi University (2008-2010), as a lecturer in Trakya University (2011-2012). He has been working as an assistant professor Trakya University since 2012. His research interests include active learning, self-regulation, motivational factors, gender and curriculum.

Gökçen İLHAN ILDIZ
1983 de Konya'da doğdu. 2005 yılında Ege Üniversitesi Eğitim Fakültesi Okul Öncesi Öğretmenliği Bölümü'nden mezun olduktan sonra, Milli Eğitim Bakanlığına bağlı okullarda 5 yıl okul öncesi öğretmeni olarak görev yaptı. 2012 yılında Namık Kemal Üniversitesi Sağlık Hizmetleri MYO'da öğretim görevlisi olarak çalışmaya başladı. 2016 yılında Trakya Üniversitesi SBE Okul Öncesi Eğitim Bilim Dalı'nda Yüksek Lisans, 2017 yılında yine Trakya Ünv. SBE Engelli Çalışmaları ABD'nda doktora eğitimine başladı. Çalışmalarına erken çocukluk eğitimi, eğitimi, özel eğitim, çocuklarda bağlanma, duygu düzenleme ve mizaç, alternatif yaklaşımlar, erken müdahale programları üzerinde devam etmekte olan Gökçen İLHAN ILDIZ'ın, ulusal ve uluslararası pek çok