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GETTING SUPPORT FROM MICROSOFT COPILOT IN LESSON PLAN PREPARATION: PRE-SERVICE TEACHERS' EXPERIENCES AND OPINIONS

Abstract. A lesson plan is an action plan that shows how to achieve the objectives of a lesson step by step in a certain period of time in the teaching of a subject. Lesson planning is one of the important elements of teacher education. However, research shows that pre-service teachers have problems in lesson planning. Artificial intelligence can produce solutions to the problems experienced by pre-service teachers. For this purpose, pre-service teachers need to be able to use this tool effectively, recognize its possibilities and limitations, and approach it with a critical perspective. The purpose of this research is to determine what support Microsoft Copilot offers to pre-service teachers in preparing lesson plans for reading education in Turkish lessons and how they evaluate this support. The method of the research is case study. The study group consists of 24 students. The data were collected through reflective diaries, lesson plans, and interviews. Descriptive and content analysis were applied to the data. As a result of the research, it was determined that teacher candidates sought support for every stage of the course. Both positive and negative opinions emerged in the same codes regarding the support offered by Copilot. Accessing the source sites, activity ideas, overall plan, and images are the codes where positive opinions are concentrated, while text creation, subject area knowledge, and question/rubric preparation are the codes where negative opinions are concentrated. Participants stated that attention should be paid to the accuracy and adequacy of the content and the accuracy of the questions and to give sufficient detail when requesting information. These results show that Copilot should be improved in terms of Turkish. However, the results also suggest that AI tools should be included in teacher education despite their limitations. Pre-service teachers evaluate the outcomes of the program with their prior knowledge. This approach is important for the development of pedagogical content knowledge and better lesson planning.

Keywords: lesson plan; Microsoft Copilot; pre-service teachers' opinions; case study

1. INTRODUCTION

The problem statement. Lesson plan shows how to achieve the objectives of the lesson, step by step, in a certain period of time in teaching a subject. The first step in preparing a lesson plan is to determine the learning outcomes. These "learning outcomes determine what and how students will learn; it guides the teacher in choosing the subject, activities and evaluation" [1, p. 33]. In order to plan instructional activities, subject area knowledge, knowledge of education and teaching methods (pedagogical knowledge), and knowledge of transforming knowledge into a teachable structure and transferring it to students (pedagogical content knowledge) are needed [2]. Therefore, lesson planning is recognized as one of the teacher competencies [3].

Planning, preparing teaching materials, managing the teaching process, and performing appropriate measurement and evaluation are among the teacher competencies. The content of a lesson plan is like a combination of all teacher competencies. In lesson plans, the learning process is handled step by step after the learning outcomes, level, duration, methods, tools, and materials are determined. The learning process basically consists of three main parts: introduction, development, and closure. In the introduction phase, the aim is to introduce the subject and to associate the student mentally and emotionally with the subject. At this stage, there are activities aimed at remembering prior knowledge, making connections with the new topic, and attracting interest in the topic. At the stage of developing the lesson, the aim is to ensure that the student receives/constructs the information. At this stage, there are materials and

activities that organize the learning experience in accordance with the selected methods and techniques. At the closing stage, the aim is to evaluate what has been learned. At this stage, according to the nature of the subject, questions for cognitive learning or rubrics for determining affective and behavioral development are included in the plan.

The main aim of education faculties is to train pre-service teachers with teacher competencies. The most important indicators that pre-service teachers transform their knowledge into professional skills are their ability to prepare a lesson plan and implement the lesson in line with the plan. A well-prepared lesson plan is a prerequisite for a well-implemented lesson process [4]. In order to achieve this, planning and implementation studies are carried out in professional knowledge courses.

When the literature is examined, it is seen that pre-service teachers have some problems in preparing lesson plans. Planning content appropriate to the course outcomes and constructivist teaching, organizing measurement and evaluation activities appropriate to the course outcomes, and assigning homework [5, 6, 7, 8, 9] stand out as the points where pre-service teachers have difficulty in planning. Overcoming these problems is possible by continuing planning efforts. It is seen that pre-service teachers who practice plan writing can achieve effective learning outcomes [10]. Instructors have an important place in developing the planning skills of pre-service teachers. The more concretely instructors demonstrate the requirements of writing lesson plans, the more lesson planning skills of prospective teachers increase [11]. However, using AI technologies seems to be an alternative way to improve pre-service teachers ' lesson planning skills.

AI systems can perform human-like learning, decision-making and problem-solving tasks with the data they are trained on. These systems trained with Large Language Models are technological neural networks designed to understand and produce natural language. By training on large corpora of text data spanning a variety of genres and languages, Large Language Models can produce contextually coherent and grammatically correct texts. These models can learn the intricacies of language patterns, syntax, and semantics from large data sets. Thus, they can produce texts that are contextually appropriate and indistinguishable from human-written content [12].

Microsoft Copilot (MC), an AI product, is a new set of technologies that integrates OpenAI's natural language processor GPT-4 and image generator DALL-E into various Microsoft products, including Windows 11, Bing Search, Microsoft Edge and Microsoft 365 applications [13]. Copilot can perform web search on Microsoft Edge; respond to spoken or written prompts; generate text, summarize information on a page, analyze text and data, and translate between languages; create visual designs with its DALL-E image generator; and work in collaboration with office programs on computers with Windows 11 operating system. All uses of Copilot are free except Microsoft 365.

The advantages of using AI for teachers include helping lesson planning, making automatic evaluations, reducing the workload of educators by providing instant feedback to students, and supporting student individual learning [14, 15, 16, 17]. However, the problems it brings with it also create controversy. Presenting false or biased information, requiring teacher review of outcomes, and ethical issues [17, 18] are at the center of the discussions. It is noteworthy in the studies that artificial intelligence tools have great potential in terms of language education. In reading education, the ability to prepare texts and develop questions about the text allows teachers to prepare materials quickly without examining many sources [19]. In writing education, it provides students with writing efficiency, spelling accuracy, content, and idea generation support [20]. With real-time feedback, it both facilitates the teacher's job and serves the students as an instructor [21]. Catboats can engage in natural and responsive dialogues with users [22]. Dialogues can take place through speaking or writing. This provides an opportunity to develop speaking skills. However, AI tools cannot understand

nuances in language and their ability to take cultural differences into account is not sufficiently developed. While it provides successful results in European languages, it has difficulty providing accurate translations in low-resource languages [23]. Therefore, educators need to examine the proficiency level in their own language and subject area before integrating AI into the course. In order for these tools to be useful in education, it is important to educate educators and students on how to use these tools, to approach AI outputs critically, and to know that these tools do not replace teachers but only support teaching and learning [24, 25].

AI can produce solutions to the problems experienced by pre-service teachers. In order for AI to be a supporting tool in the lesson planning process, pre-service teachers must be able to use this tool effectively and recognize its possibilities and limitations. Thus, they can gain an advantage in ensuring technology integration in education. Moreover, the proficiency of AI tools in a language and a subject area depends on the data set they are trained on. Therefore, its competence in each language and each subject area should be examined separately. For this reason, it is important to examine the ways in which pre-service teachers seek support from MC, an AI product, and their views on this support.

Analysis of recent studies and publications. There are few studies on lesson plans prepared with AI tools. Research shows that lesson plans prepared with AI technologies are sufficient in terms of content and effective in ensuring academic success. van den Berg and du Plessis [25] asked the ChatGPT application to create a lesson plan on prepositions for 6th graders to be used in teaching English as a second language, and they obtained a plan containing the basic elements that should be included in a lesson plan. However, teachers who examined the plan stated that this plan was only a framework plan, that it needed to be developed with resources, and that it was still a time saver. In the continuation of the study, a quiz and a visual presentation for the subject were requested. It was determined that there were deficiencies in these materials and that the suggestions they offered needed to be improved. Baytak [26] created lesson plans for 7th grade mathematics, science, English, and social studies courses with ChatGPT and Gemini applications without determining a teaching approach. As a result of the research, it was determined that the lesson plans created by the programs were similar to those created by humans in terms of sentence structures, lesson activities, and evaluations, but the plans included a mixture of both behavioral and constructivist approaches. Karaman and Göksu [27] examined how teaching with ChatGPT and teacher-prepared lesson plans affected academic success in the 3rd-grade primary school mathematics course. As a result of the research, it was determined that the education provided with the lesson plans prepared by ChatGPT was more effective in academic success. Davis and Lee [15] used course topics and lesson plans created by ChatGPT and the AI teacher website in an AI course in education for graduate students for one semester. It was seen that the topics and subtopics of these websites met the expectations for the course. Despite these opportunities, some limitations were also observed. Unlike human educators, AI did not have the ability to integrate previous lessons with current learning experiences or strategically prepare students for future learning outcomes. In order to generate the desired outcomes from ChatGPT, it was determined that the instructions should be detailed. In addition, the AI was found to produce fake research articles with DOI numbers in well-known journals by well-known authors in the field.

The studies generally aim to explore the possibilities and limitations of AI programs in preparing lesson plans. For this reason, plans created with the requests given by the researchers were analyzed (15, 19, 26]. In another study, lesson plans prepared by AI and teacher-made lesson plans were compared in terms of their effect on academic success [27]. No study has been found in the literature based on preparing lesson plans with AI tools by prospective teachers. One of the very important elements of teacher training is lesson planning. Previous studies show that pre-service teachers have problems in lesson planning [5 – 9]. This study

makes an original contribution to the literature by examining the possibilities and limitations of Copilot for planning reading instruction from the perspective of pre-service teachers.

The research goal. AI tools have the potential to support pre-service teachers in the lesson planning process. In the literature, it is seen that researchers have examined the adequacy of these tools through exploratory studies. There is a gap in the literature on how prospective teachers benefit from artificial intelligence in the planning process. In addition, the adequacy of these tools depends on the data set they are trained on. In this context, the aim of the research is to determine what support MC provides to pre-service teachers in preparing lesson plans for reading education in Turkish lessons and how they evaluate this support. The questions guiding the research are as follows:

1. What support do pre-service teachers seek from MC during the lesson planning process?

2. What do pre-service teachers think about the support offered by MC in the process of preparing lesson plans?

2. RESEARCH METHODS

The research was conducted with a case study, one of the qualitative approaches. The defining features of the case study are in-depth investigation of the situation, focus on processes and interactions, multiple data collection, observation in the natural environment, and holistic interpretation [30]. This research focused on describing the opportunities and limitations offered by Copilot in preparing lesson plans and how pre-service teachers perceived these opportunities and limitations. Since the research was conducted to deeply examine how artificial intelligence tools contribute to the process of preparing lesson plans, a case study design was used.

The study was conducted with students studying in the Turkish teaching at a state university. A total of 24 pre-service teachers, 13 female and 11 male, voluntarily participated in the study. The participants were 4^{th}-grade students.

Three data collection tools were used to obtain in-depth information about the subject. These tools are the reflective diaries of pre-service teachers about the lesson plan preparation process, the lesson plans they prepared with Copilot support, and the interview form about the Copilot experience.

Students were asked to copy all the questions they wrote to the program and the answers they received, transfer them to a Word file, and write their thoughts about the answers they received. With these reflective diaries, both the information that the participants sought from the program and their opinions about the answers given by the system were examined.

Lesson plans for reading education were prepared by 24 students for 8 different outcomes. The outcomes to determine the competencies of the Copilot program in the dimensions of vocabulary development and comprehension in reading education were selected and presented to pre-service teachers. The planned outcomes are as follows:

Determines the subject of the text

Identifies the word arts in the text (simile and personification)

Explains the contribution of nouns and adjectives to the meaning of the text (Adjectives)

Use reading strategies (note-taking strategy)

Distinguishes the functions of conjugation suffixes (Verb conjugation suffixes, meaning shift in verbs)

Identifies expression disorders in the text (Expression disorders related to meaning)

Makes inferences about what they read (cause-effect, purpose-effect)

Distinguishes text types (article and essay)

Each outcome was given to 3 students. The outcomes were distributed randomly. Each student was first asked to ask the question "Can you prepare a constructivist lesson plan for ... minutes on the subject of ... at ... grade level?" The students were asked to write various questions to make the plan offered by Copilot functional and to create their plans by making use of the options offered by the program. They were asked to write the explanation sentences in the framework plan for the parts of the plan that they could not get support from Copilot, and to transfer the activities that they could get support for to their plans. The prepared plans were used to support the findings of the study; they were not analyzed as a separate sub-problem.

Some opinions that were thought to be inaccessible through reflective diaries were collected through an interview form. While preparing the interview form, a literature review was conducted, and expert opinions were utilized. The following questions were included in the interview form: "What should the users of the program pay attention to? What are your expectations for the program to be more useful? Would you like to continue using MC program in the lesson plans you will prepare in the future? Why?" Student opinions were taken in writing.

Data were collected in the fall semester of the 2023-2024 academic years. Before the data collection process, pre-service teachers were introduced to constructivist teaching and 5E method. Then, information was given about the usage features of the MC program. Participant response bias is one of the factors that limit the reliability of the results in qualitative research. Participants used Copilot for the first time. They were informed about how to use the program. In order to avoid shaping their opinions, the opportunities and limitations of artificial intelligence in education were not mentioned. The information process was completed in 3 hours. At this stage, it was stated that participation in the study was voluntary. Those who wanted to participate in the study were given one month. Students worked outside the class and submitted their files via e-mail.

Before starting the research, ethics committee approval was obtained.

Descriptive analysis and content analysis were applied to the data. The support that pre-service teachers sought from MC during the lesson planning process, their lesson plans, and the questions in the interview form of the research were analyzed through descriptive analysis. Descriptive analysis is the analysis conducted within the framework of the questions or themes of the research. In descriptive analysis, the data are brought together in a meaningful way within the framework of predetermined themes, defined, supported, and interpreted with direct quotations when necessary [32]. Reflective diaries were analyzed through content analysis. Content analysis is conducted to identify the concepts that can explain the data when these concepts are not known beforehand. In content analysis, firstly, the data that form a meaningful whole are coded, themes (concepts) are determined based on the common aspects of the codes, then the data are organized, defined, and interpreted [31]. During the content analysis process, the data set was reviewed repeatedly and the sections that could be combined under the same meaning were identified, these meaningful sections were given a name and a code list was created. Since it was observed that both positive and negative opinions were included in the same codes, the codes were grouped under positive and negative themes. To hide the names of the participants, they were coded as P1, P2.

In order for qualitative research to accurately reveal the phenomenon it aims to measure, to be unbiased, that is, to ensure the validity of the research, methods such as data triangulation, participant confirmation, and peer confirmation are used. In addition, reporting the collected data in detail is a criterion that ensures validity in qualitative research [31]. To ensure validity in this research, data diversity was ensured by collecting data through reflective diaries, lesson plans and interview forms. The data is presented in detail by including direct quotations in the research report.

Reliability in qualitative research is related to the consistency of the results. In order to ensure consistency, it is important to make the researcher's position clear, define the participants, define the social environment in which the research is conducted, present the conceptual framework of the research, and explain the data collection and analysis methods [31]. In this study, criteria other than analysis methods are explained in the method section. In order to ensure consistency in data analysis, the data were coded by a field expert other than the researcher. Miles and Huberman [32] formula [Agreed errors / (agreed errors + disagreed errors) x100] was used to determine the level of agreement between the experts. There was 88% agreement between the coding. The inconsistent coding was discussed, and harmonization was achieved.

3. THE RESULTS AND DISCUSSION

3.1. Results

The findings regarding the supports that pre-service teachers seek from MC during the lesson planning process are presented in Table 1.

Table 1

Supports seeking from Copilot

Course Stage	Topics Seeking Support	*f*
Engage (*f* = 19)	Methods to make the topic interesting	15
	Ways to stimulate thinking about the topic	4
	Image to draw attention to the topic	4
Explore (*f* = 31)	Text sample	24
	Example sentences	7
Explane (*f* = 33)	Subject area knowledge	24
	Image/visual design for the subject	9
Elaborate (*f* = 26)	Worksheet	8
	Activity examples	7
	Interactive work website	7
	An outline for students to write their own texts	4
Evaluate (*f* = 24)	Quiz	15
	Rubric	9
Assignment (*f* = 6)	Assignment suggestion	6

The supports that pre-service teachers sought from Copilot during the lesson planning process were categorized in relation to the stages of a constructivist lesson. Each student first asked the question, “Can you prepare a constructivist lesson plan for ... minutes on the subject of ... at ... grade level?” Then, the students asked new questions by considering the explanations in the plan prepared by the program. As seen in Table 1, students searched for supports related to explanation (f = 33), exploration (f = 31), elaborating (f = 26), evaluation (f = 24), engaging (f = 19) and homework (f = 6), respectively. All of the students (f = 24) searched for text sample for the exploration stage and subject area knowledge for the explanation stage. More than half of them asked for methods to make the topic interesting in the engaging stage (f = 15) and a short exam sample for the evaluation stage. A small number of students (f = 6) sought homework assignments at the end of the lesson. The program provided assignment suggestions in some students' plans, but most plans did not include assignment suggestions, even if they were on the same topic. In the plans with assignment suggestions, students asked questions to elaborate on the homework.

When the lesson plans are analyzed, it is seen that the first plan presented by Copilot includes the stages of the lesson, the time to be allocated to these stages, and explanations about what needs to be done. For example, in the engaging stage on verb conjugation suffixes, there is an explanation as follows: "*Start the lesson by sharing examples of different verb tenses (e.g. past, present, future). Discuss why verb tenses are important for communication*." Since Copilot's first plan included suggestions, the pre-service teachers diversified their search for support by asking questions to make these suggestions actionable.

The participants were asked to write in their reflective journals what they thought about this support offered by Copilot. When the opinions of the pre-service teachers were analyzed, it was seen that they expressed both positive and negative opinions in the same codes. The results of the analysis are presented in Table 2.

Table 2

Opinions about the support provided by MC

Codes (f)	**Themes**	
	Positive (*f*)	**Nagative (*f*)**
Overall plan (24)	15	9
Text creation (24)	6	18
Activity ideas (24)	19	5
Source websites (24)	20	4
Images (21)	15	6
Subject area knowledge (21)	6	15
Operation of the system (21)	10	11
Preparing questions/rubrics (18)	6	12
TOTAL	97	80

As seen in Table 2, pre-service teachers' opinions about the support provided by MC in the process of preparing lesson plans are grouped under 8 different codes in positive and negative themes.

All participants expressed their opinions regarding the overall plan. Positive opinions (f = 15) are in the majority and are related to the fact that the plan is suitable for constructivist teaching phases and that the time allocated to these phases is appropriate. Negative opinions (f = 9) were based on 3 reasons. The first one is that the curriculum provides a plan for behaviorist learning or includes a mix of constructivist and behaviorist teaching: "*It presents suggestions for constructivist and behaviorist teaching together at various stages of the plan.* " (P4). The second reason is related to the fact that Copilot suggests activities that do not fit the relevant stage of the lesson: A participant who prepared a plan on adjectives encountered the suggestion "Explain adjectives" at the engage stage and criticized this suggestion by saying, *"If I start by directly explaining adjectives, I will not be teaching constructivist*." (P10). The third reason is related to the need to work hard to develop the plan offered by the program: "*It does not include elements that I will use in the lesson such as activities, sample texts, or assessment. It only suggested 'Make students curious with an attention-grabbing question or story'. However, I would like to see which question I can attract their attention.*" (P21).

Some participants expressed positive opinions (f = 6) about text creation, but negative opinions (f = 18) were the majority. The participants who expressed positive opinions were those who worked on the achievements of the subject and text types in the text. One of these participants said, "I*t wrote a good text that includes the topic comprehensively*." (P2). However, the students who worked on other learning outcomes expressed negative opinions due to "*insufficient in preparing texts for the outcome*" (P1), "*there are expression disorders and inconsistent expressions in the text*" (P4), "*the texts are too simple for the level" (P7),*

"informative texts are always given in bullet points" (P12), "*narrative texts are not of a quality that students can read with pleasure*" (P17), and "*a forced content is felt for the subject*" (P24).

All of the students expressed opinions about activity ideas, and positive opinions (f = 19) outnumbered negative opinions (f = 5). The students who expressed positive opinions were pleased to encounter "*nice activities that can attract interest in the subject*" (P1). They also came up with new ideas, such as the student who said, "*I would not have thought of teaching adjectives with creative drama activities*." (P14). Negative opinions were based on two reasons. The first is that the proposed activity is not suitable for the relevant stage of the lesson. An example in this regard was expressed by P19: "*At the beginning of the lesson, I asked how I could encourage students to think about this topic, and she suggested creative writing activities. I found it strange that it suggested creative writing activities at the engage stage*." The second is that it suggests sites suitable for studying English in response to requests for interactive activities: "*For interactive work, it first directs us to sites for English language teaching*." (P9).

All of the students expressed opinions about the source websites. The majority of these opinions were positive (f = 20), and some were negative (f = 4). Positive opinions were as follows: "*It is time-saving to reach many resources. I can access them with a click*." (P5), as seen in the example, is related to the fact that it provides resources for the information provided by the program. Negative opinions are related to the fact that it presents resources that are not suitable for the level along with others: "*One of the websites it suggested was for fourth graders. However, the plan was for 6th graders*." (P11).

Positive opinions about the images (f = 15) were higher than negative opinions (f = 6). Positive opinions are related to the fact that the program provides images that support the texts, as in the examples of "*The image was related to the topics I wanted*." (P3), "*It was nice that it spontaneously created an image when I asked it to create a text.*" (P8) are related to the fact that the program provides images that support the texts. However, sometimes the images are not related to the text, as in the example of "T*he image is not related to the text it presents.*" (P15). Another reason for another negative opinion is that the texts in the images are not in Turkish, as in the example "*Although I asked for examples in Turkish, the images include examples in languages other than Turkish*." (P6).

Positive opinions about subject area knowledge (f = 6) are few, while negative opinions (f = 15) are high. Positive opinions came from the participants who worked on the outcomes of subject and text types in the text. Positive opinions are related to finding sufficient information about the subject area. For example, P18 stated, "*It gave very accurate and comprehensive information.*" The reasons for negative opinions are that the information given by the program is wrong or incomplete and that it gives incorrect examples even if it gives correct information. For example, the student working on adjectives asked for information about adjective types. The program classified adjective types as qualifying adjective, indicative adjective, indefinite adjective and adjective phrase. P16 criticized this situation: "I*n Turkish, we examine adjectives in two groups as qualifying and indicating adjectives. This classification is confusing.*" P21 worked on reading strategies. When the participant asked, "*What should I tell students about note-taking strategies?*" s/he encountered incomplete information: "*It presented information about the Cornell method, mind mapping, comparative note-taking technique, and summarizing strategies. When I analyzed the information, I saw that the Cornell method and the comparative note-taking technique contained incomplete information. It was impossible to apply these techniques based on the information it provided.*" P20 encountered incorrect examples about tense shift in verbs: "*The information it gave to the questions I asked about tense shift in verbs is theoretically correct, but the examples are not about tense shift, but about basic and figurative meaning*."

Positive (f = 10) and negative (f = 11) opinions on the operation of the system are close to each other. The students' positive opinions are related to the fact that the program is

"*integrated with Office tools*" (P6), "d*oes not see spelling and punctuation mistakes as a communication barrier*" (P13), "*keeps previous correspondence in memory*" (P17), "*is easy to use*" (P21) and "i*ncludes a visual design tool*" (P8). All of the negative opinions are related to the program's lack of command of Turkish. Students emphasized the language problem of the system, such as "*directing to English examples and websites*" (P16) and "*using artificial language in the texts*" (P24).

Regarding the question/rubric preparation, 6 students expressed positive and 12 students expressed negative opinions. Positive opinions were as follows: "*I asked her to prepare a rubric to give feedback to the texts written by peers. She prepared a rubric with good criteria.*" (T1), "I*t prepared correct and good questions, I also asked for the answers to the questions, and gave the answers correctly*." (P18). Negative opinions stem from the fact that the questions were not suitable for the purpose, did not fully cover the subject, and sometimes even repeated the plan instead of writing questions. For example, the student who asked for a quiz on verb conjugation suffixes encountered questions such as "How did you find this lesson?" and "Which subjects did you understand better?" The student evaluated this situation as follows: "*It does not prepare questions to evaluate the learning outcome. When I asked for questions for this purpose, the questions I received were not about cognitive learning, but evaluation questions about the materials and methods of the course in general.*" (P1). A student who prepared a plan for expression disorders in sentences criticized that the questions did not fully cover the subject as follows: "*It only gave questions related to the use of unnecessary words and the use of words that contradict in meaning. This is a content that does not fully cover the subject.*" (P5). A student who worked on adjectives, on the other hand, was faced with the repetition of the first plan instead of question examples. The student expressed this situation as "I*t did not prepare questions, it repeated the plan.*" (P22).

The deficiencies identified above were also reflected in the lesson plans. When the lesson plans prepared by the prospective teachers were examined, it was seen that the plans that were complete and included the activities of all stages of the lesson were aimed at determining the subject in the text. In the lesson plans for other outcomes, some lesson stages were fully planned with examples, activities, measurement, and evaluation, while the work to be done in some stages remained as an explanation sentence.

Participants were asked what to pay attention to when preparing lesson plans with Copilot. The analysis made on this issue is presented in Table 3.

Table 3

Considerations when using Copilot

Considerations	***f***
Accuracy of the content	21
Accuracy of the questions	14
Adequacy of the content	13
Giving enough detail when requesting information	5

As seen in Table 3, participants made suggestions regarding the accuracy of the content provided by the program (f = 21), the accuracy of the questions (f = 18), whether the content was sufficient (f = 13), and giving enough detail when asking for information (f = 5). In terms of content accuracy, there are no satisfied students except those who prepared a topic plan in the text. The fact that there were suggestions other than constructivist teaching elements in the lesson plan created doubt about the accuracy of the content offered by the system: "*I would not be able to do constructivist teaching if I only relied on this system and created a plan. It is absolutely necessary to examine the suggestions it gives with our prior knowledge*." (P4). The program's limitations in compiling information about Turkish from the internet resulted in

inaccurate content. For example, one student encountered the following information: "*[When I saw] expresses an action that took place in the past and is also used as a conditional verb.*" This student stated, "*It is incompatible with Turkish and makes wrong explanations*." (P19). Participants expect the questions prepared by the program to be appropriate to the subject and level, comprehensive, and problem-free in terms of test technique. Regarding the inadequacy of the content offered by the program, the participants were dissatisfied that the program remained very superficial in compiling information: "*It collects information on the subject from various sites in a superficial, incomplete or complex way*." (P5). Students who suggested giving enough detail when asking information from the program were sometimes able to access the content they were looking for after elaborating the question 3-4 times. For example, a student working on adjectives describes the process of searching for a suitable interactive site as follows: "*I asked Copilot for interactive study sites for the topic of adjectives, and it suggested pages for teaching adjectives in English. Then I asked it if it suggest interactive sites to study this topic in Turkish class, and this time it suggested sites for learners of Turkish as a foreign language. Finally, I asked, if it suggests sites where I can do interactive activities for students whose mother tongue is Turkish? It suggested 3 sites.*" (P22).

Participants were asked whether they would continue to use the Copilot program when preparing lesson plans in the future and were asked to explain the reasons for their preferences. The results of the analysis on this issue are presented in Table 4.

Table 4

Opinions about continuing to use the program

Idea of using	**Causes**	***f***
Yes	Meeting the demands completely	3
Sometimes	The plan gives a general idea (f = 15)	15
	Activity suggestions are interesting (f = 13)	
	Providing access to resources (f = 12)	
No	Not practical	6

The students who said they would use the program later (f = 3) were the students who worked on the topic in the text. The program fully met all the demands of the students working on this subject: "*I benefited a lot from the ideas she gave. The fact that she created a text about the subject and supported the text with visuals made my work easier. The rubric she prepared was suitable for the purpose. I was able to prepare the plan from a single place without getting lost in internet search engines. If I had prepared this plan myself, it would have taken me hours.*" (P18). The students who said that they sometimes use it (f = 15) were not fully satisfied with the program in general, but they found it positive that the plan provides ideas in general, the activity suggestions are interesting, and leads to resource sites. For example, one student emphasized that s/he could use the program in terms of giving ideas and providing access to resource sites but that s/he should be careful against mistakes: "*While preparing my own plan, I can get help when I need it, when I have difficulties. If I am careful I can see the mistakes, but it gave me ideas. I can use it to explore resource sites.*" (P12). Another student emphasized with a metaphor that she could not completely trust Copilot but could get support from it: "*I can use it to get activity ideas while preparing my own plan. This program can be Copilot, but I have to be the pilot*." (P23). Students who said no (f = 6) did not find the program practical. The reason for this is related to not getting the right answers to their questions and elaborating the questions until they reached the right answer: "*Sometimes I had to elaborate the question 3-4 times to get the right answer. It takes time to formulate the answer after each question. It is faster to access information on the internet. This extends my time to prepare a plan even more*." (P22).

3.2. Discussion

This study was conducted to determine which supports pre-service teachers seek in preparing lesson plans using the MC program and how pre-service teachers evaluate the support provided by the program. As a result of the research, it was seen that pre-service teachers sought support from MC for all stages of a constructivist lesson in the lesson planning process. When the stages of the lesson were taken into consideration, it was seen that their support searches were related to explanation (f = 33), exploration (f = 31), elaborating (f = 26), evaluation (f = 24), engaging (f = 19) and homework (f = 6), respectively.

The pre-service teachers expressed both positive (f = 97) and negative (f = 80) opinions about the support provided by Copilot in the lesson plan preparation process. It was determined that the positive and negative opinions were related to the plan offered by the program, text creation capacity, activity ideas, resource site suggestions, images created, subject area knowledge, functioning of the system and question/rubric preparation.

Regarding the points that the users of the program should pay attention to, the pre-service teachers stated that they should pay attention to the accuracy of the content (f = 21), the accuracy of the questions prepared by the program to assess outcomes (f = 18), the adequacy of the content offered (f = 13) and giving enough detail when asking for information (f = 5).

The prospective teachers were asked about their expectations for the program to be more useful. It was determined that the participants had expectations that the lesson plans should be in a content that could carry out the lesson step by step (f = 22), that the program should compile the information consistently (f = 20), that it should have a good command of Turkish (f = 12) and that it should present visuals compatible with the text (f = 9).

The pre-service teachers were asked whether they would continue to use the MC program in the lesson plans they would prepare after this experience. Three of the participants stated that they would definitely use it, 13 stated that they would sometimes use it, and six stated that they would not use it.

The results obtained are discussed below in terms of cause-effect relationships and by comparing them with previous research on the use of AI in education.

In the engage stage, the aim is to attract interest in the subject, to mobilize prior knowledge, and to prepare the mind for the new subject. At this stage, pre-service teachers searched for methods to make the subject interesting, ways to stimulate thinking about the subject, and interesting images. The activities offered by the program in terms of methods to make the subject interesting and ways to stimulate thinking about the subject were generally found positive. Most of the participants evaluated the images positively. Because the program was able to prepare visuals related to the topic, and even though only text was requested, the program spontaneously presented text with images. However, students who were looking for text-related images sometimes could not find them. Some students also encountered non-Turkish images.

It was observed that one of the stages of the lesson that the pre-service teachers were in intense search for was the exploration stage. In the exploration phase, it is aimed for the student to construct knowledge about the subject by going from example to rule. For this reason, pre-service teachers searched for texts or sentences that could make the subject intuitive. The participants who were satisfied with the text formation competence of the program were those who worked on the outcomes of topic and text types in the text. However, the students who worked on other outcomes found the texts insufficient to make them intuit the outcomes. The texts were also evaluated negatively in terms of not being suitable for the level, being inconsistent and not being a text that the student can read with pleasure. There are studies showing that AI tools can generate coherent, (partially) accurate, informative and systematic texts [16]. However, it should be noted that they may not always produce perfect results in every context [15]. It is also important that users are competent in guiding users to achieve the

desired results [33]. When the reflective diaries of the participants were analyzed, it was seen that they directed sufficiently detailed questions to the system, but they could not obtain texts suitable for the purpose. This problem with texts shows that the system is not well trained in writing Turkish texts.

It was observed that the pre-service teachers' search for support from MC during the lesson planning process was concentrated in the explanation section of the lesson. In this section, they searched for subject area-specific information, such as what they should include in the content of the subject and knowledge of concepts. The students who were satisfied in terms of subject area knowledge were only those who worked on the learning outcome of identifying the topic in the text. The students who studied the other objectives saw that the content offered by the program was incorrect or insufficient. For this reason, the pre-service teachers stated that the users of the program should pay attention to whether the content provided by the program is sufficient or not and that the program should compile the information consistently to make it more useful. Farrokhnia et al. [28] analyzed educational research using ChatGPT. In this research, it was found that the lack of an in-depth understanding of the meaning of the words processed by AI tools can lead to answers that are off-topic or lack a nuanced understanding of domain knowledge. This lack of understanding of context is considered as a threat of AI in the educational environment, as it may result in content recommendations that are too difficult or too easy.

In the elaboration stage of the lesson, the aim is for students to be able to use their knowledge in new situations. In order to achieve this, pre-service teachers searched Copilot for worksheets, activity examples, interactive study sites and draft texts for students to write their own texts. The activity ideas offered by the program were mostly positively evaluated by the participants. They found new and interesting activity ideas that they had not thought of before. However, the students evaluated this situation negatively when they encountered suggestions that did not fit the relevant stage of the course and sites primarily for teaching English for interactive work. Suggestions for resource sites were also evaluated positively by the pre-service teachers to a great extent. They were pleased to see where they could find the information they were looking for in a short time. A few students expressed negative opinions because they saw that the suggested resource site was not appropriate for their level. Worksheet searches were not included in the pre-service teachers' plans because they offered a content that did not cover the topic sufficiently, and interactive worksheets were not included in their plans because they were intended for English language teaching.

The aim of the evaluation stage is to determine whether the learner has acquired new knowledge. At this stage, the participants asked Copilot to prepare a quiz or rubric according to the nature of the outcome. Some participants responded with rubrics and questions that were suitable for the purpose, but most of them stated that the questions were not suitable for the purpose, did not fully cover the topic, and sometimes even repeated the plan instead of writing questions. In the study conducted by Zileli [29], ChatGPT was asked to prepare basic level questions for learners of Turkish as a foreign language. It was observed that the questions prepared by ChatGPT had unstructured and meaningless sentences, and there were mistakes in the answer key. AI tools produce answers depending on the data set they are trained on. It is seen that they are not yet at the desired level in terms of Turkish usage.

In the closing stage of the lesson, homework is given after the assessment to ensure that what has been learned is permanent. Homework was one of the supports that pre-service teacher sought from Copilot. Copilot included homework in some plans, but most plans did not include homework. Even the plans for the same outcome had homework in one plan but not in the others. In cases where Copilot suggested homework, students sought homework support. This situation is important in terms of showing that Copilot's suggestions guided the pre-service

teachers' searches. As a result, pre-service teachers were able to prepare constructivist lesson plans with the support of Copilot.

The pre-service teachers were sometimes able to find the support they were looking for while preparing lesson plans, and sometimes they did not. However, they generally evaluated the lesson plan proposal prepared by Copilot positively. Most of the participants stated that it was suitable for constructivist teaching stages and that the time to be spent in these stages was sufficient. However, some of the participants encountered suggestions that were suitable for the behaviorist teaching approach and did not fit the relevant stage of the lesson. This situation seen in the research is important in terms of showing that pre-service teachers evaluate the first plan with a critical approach. In the study conducted by Baytak [20], it was observed that both behavioral and constructivist approaches were intertwined in the plans prepared by ChatGPT. The pre-service teachers did not find Copilot's plan proposal suitable for teaching the lesson step by step and tried to improve the plan with various follow-up questions. Therefore, they suggested that Copilot should prepare a more useful plan. A similar result was observed for ChatGPT in the study conducted by van den Berg and du Plessis [25]. In this study, the teachers who examined the plan stated that this plan only provided a framework and that it should be developed with resources.

Participants who evaluated the general functioning of the Copilot program expressed positive opinions because it was easy to use, integrated with Office tools, remembered previous correspondence, and had a visual design tool. Copilot can remember context from the first question and provide relevant answers even if follow-up questions do not use the same subject repeatedly. This is considered an advantage of AI tools in terms of meeting the student's personal learning needs [28]. However, negative opinions related to the Turkish problems of the system were also identified. The pre-service teachers negatively evaluated the fact that the system provided English visuals and resource sites, felt an artificial language in the texts it generated, and provided incorrect information or examples on Turkish grammar.

Evaluating the overall functioning of the Copilot program, participants were positive about its ease of use, integration with Office tools, recall of previous correspondence, and visual design tool. Copilot is able to remember the context from the first question, and although it does not use the same subject repeatedly in follow-up questions, it is able to give appropriate answers. This is considered as an advantage of AI tools in terms of meeting the personal learning needs of the learner [28]. However, negative opinions related to the Turkish problems of the system were also identified. It was evaluated negatively that the system provided English visuals and resource sites, felt an artificial language in the texts it generated, and provided incorrect information or examples on Turkish grammar.

The pre-service teachers' experiences in preparing lesson plans through Copilot revealed some points that the users of the program should pay attention to. The pre-service teachers stated that attention should be paid to the accuracy and adequacy of the content, the correctness of the questions, and giving enough detail when requesting information from the program. It was seen that the users of the program should evaluate with their prior knowledge and use the program with a critical approach. It is understood that pre-service teachers should be trained to give enough detail when requesting information from Copilot. A similar situation is also valid for ChatGPT. According to [15], the instructions should be detailed in order to create the desired outcomes from ChatGPT. Training pre-service teachers on the use of artificial intelligence will create an opportunity to see the problems of the program and to critically evaluate its suggestions.

After this experience, the pre-service teachers were cautious about continuing to use Copilot to prepare lesson plans. Only three students met all their expectations to the extent that they would definitely use it. The students who said that they would use it sometimes liked the fact that the plan gave a general idea, that the activity suggestions were interesting and that it

led to resource sites, but they realized that it was necessary to be careful against mistakes. The students who said no did not find the program practical. Because they realized that they could not get correct answers to their questions and that they had to elaborate the questions too much until they reached the correct answer.

4. CONCLUSIONS AND PROSPECTS FOR FURTHER RESEARCH

This study is based on pre-service teachers' experiences of lesson planning and their views on this process. The findings of the study provide a holistic view of Copilot's planning, content creation, assessment and evaluation, and limitations. MC guided the pre-service teachers to a great extent in presenting a constructivist lesson plan for reading instruction in Turkish lessons. Especially activity ideas, image support and easy access to resource sites stand out as the conveniences offered by MC. However, it is necessary to be careful against the possibility of the program giving false information and to carefully examine the content and assessment and evaluation tools.

The results of the study emphasize some important points in terms of teacher education and future research. Advantages and disadvantages of Copilot can be seen as opportunities in teacher education. Studies in the classroom will create an effective environment for pre-service teachers to recognize the advantages of the program and criticize misinformation. The program offers many suggestions when asked for activity ideas. Some of these suggestions were found to be constructivist and some were suitable for behaviorist teaching. Discussions can be held on the activities to develop the skills of prospective teachers in choosing activities suitable for constructivist teaching. It was observed that some activity suggestions were not suitable for the stage of the lesson. Discussing why such activities were not suitable can contribute to the development of pre-service teachers' lesson planning skills. Copilot sometimes presents inaccurate content on the subject. Discussing why these contents are not correct can support the reinforcement of subject area knowledge. As a result, the discussions can contribute to the development of teacher candidates' pedagogical content knowledge and better lesson planning. AI tools such as Copilot should be included in the teacher education process to train effective teachers. The starting point can be the information technologies course given in the first grade. In this course, there are contents for using word, excel, and power point. AI should be added to this content. Then, AI programs should be included in the instructional technologies course in the second grade. In courses aimed at developing language skills (e.g. listening, speaking, reading, writing), AI literacy of prospective teachers should be supported by conducting applied studies.

The study has some limitations. One of them is that the sample consisted of 24 pre-service teachers. The results of this study conducted with a small group cannot be generalized; it can only give an idea for similar situations. Another limitation is that the participants were Turkish education students. The results of this study can give a field-specific idea, but it cannot determine how artificial intelligence can give results in other languages. This is another limitation of the research. Because AI tools can produce sufficient results within the scope of the data set they are trained on. It is suggested that Copilot's competence in each language should be examined separately for its use in mother tongue teaching.

This research focused on pre-service teachers' lesson plan development with the support of Copilot. Copilot also has the features of giving feedback to written texts, criticizing their deficiencies, and commenting on the aspects open for improvement. In future research, the plans prepared by pre-service teachers can be presented to Copilot and Copilot's suggestion capacity to improve the plans can be investigated. AI tools such as Copilot, Google Gemini, ChatGPT etc. were trained with different data sets. The field-specific competencies and limitations of these tools can be examined through comparative research.

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ПІДТРИМКА MICROSOFT COPILOT У ПІДГОТОВЦІ ПЛАНІВ УРОКІВ: ДОСВІД ТА СТАВЛЕННЯ МАЙБУТНІХ УЧИТЕЛІВ

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Анотація. План уроку – це план дій, який показує, як крок за кроком досягти цілей уроку за певний проміжок часу при викладанні предмета. Планування уроку є одним з важливих елементів педагогічної освіти. Однак дослідження показують, що вчителі-початківці мають проблеми з плануванням уроків. Штучний інтелект може запропонувати рішення проблем, з якими стикаються вчителі-початківці. Для цього вчителі повинні вміти ефективно використовувати цей інструмент, критично підходити до його використання, усвідомлювати його можливості та обмеження. Мета цього дослідження – визначити, яку підтримку Microsoft Copilot пропонує вчителям-початківцям у підготовці планів уроків для навчання читання на уроках турецької мови і як вони оцінюють цю підтримку. Метод дослідження – кейс-стаді. Дослідницька група складалась із 24 студентів. Дані були зібрані за допомогою щоденників рефлексії, планів уроків та інтерв'ю. До даних було застосовано описовий та контент-аналіз. У результаті дослідження було визначено, що кандидати на посаду вчителя

шукали підтримки на кожному етапі курсу. В одних і тих самих кодах з'явились як позитивні, так і негативні відгуки про підтримку, яку пропонував «Copilot». Доступ до сайтів-джерел, ідеї для занять, загальний план та зображення – це ті коди, де сконцентровані позитивні відгуки, тоді як створення тексту, знання предметної області та підготовка запитань/рубрик – це ті коди, де сконцентровані негативні відгуки. Учасники зазначили, що слід звернути увагу на точність і адекватність змісту та точність запитань, а також надавати достатню кількість деталей при запиті інформації. Ці результати показують, що «Copilot» потребує вдосконалення для турецької мови. Однак результати також свідчать про те, що інструменти штучного інтелекту мають бути додані до програми підготовки вчителів, незважаючи на їхні обмеження. Учителі-практики оцінюють результати програми, спираючись на свої попередні знання. Такий підхід є важливим для розвитку знань педагогічного змісту та кращого планування уроків.

Ключові слова: план уроку; Microsoft Copilot; ставлення майбутніх учителів; тематичне дослідження