

Received : 27-08-2024

Published : 22-12-2024

Assessing Attitudes of Artificial Intelligence Tools in Academic Research: A cross-sectional survey among EFL doctorate students

Fatima-Zohra BelkhirUniversity of Tlemcen, Algeria, fatimazohra.belkhir@univ-tlemcen.dz

Abstract

There is no doubt that Artificial Intelligence (AI) has revolutionized various domains including education and research. Yet, attitudes towards the use of AI are controversial. This study aims to investigate the perception of artificial intelligence tools in research among EFL (English as a Foreign Language) doctorate students of the department of English, University of Tlemcen in order to provide valuable information for understanding and addressing the extra challenges students face in doing research nowadays. In so doing, a cross-sectional study was conducted with 15 doctorate students using Google forms questionnaire. The questionnaire consisted of three sections to examine (a) the respondents' barriers to research, (b) their positive perception towards research and (c) their negative perception towards research all in the light of the current hands-on of AI tools. The results indicated that almost all informants heard and read about AI while only 20.25% stated that they have good or excellent knowledge about it. Speaking about their general perception, approximately half of the respondents 54% rated the use of AI tools in research as positive and the other half (46%) as negative. It is worth noting as a conclusion that although showing only a mediocre perception and knowledge about artificial intelligence, the majority of students rated AI in research as positive. Following this finding, the study calls for an urgent need to implement institutional rules and measures that would strengthen the development and the growth of scientific production in the university context among novice researchers, doctorate students included.

Keywords : Artificial Intelligence, ChatGPT, academic research, attitudes, doctorate students

1. Introduction

Artificial Intelligence (AI) tools are increasingly influencing every aspect of society and education and research is not an exception. Nowadays research is very pertinent in university milieus, since quality systems firmly demand evidence on impact research projects, theses and dissertation, considering research an essential function that each university institution must consider and develop. In the common university world, students used to develop their research potential from their academic training and the processes of linking with the community. Yet, in the current university world, students are allowed to study and do

research in a ‘different’ method which allows the creation of autonomous knowledge, strengthens traditional knowledge and encourages students to care about their learning. In so doing, university students have been encouraged to use AI tools to promote their self-learning, a fact that may result in a lack of interest and/or negative attitudes towards science and technology which may eventually lead to deficient knowledge about science and a lack of initiative and involvement in scientific projects. Following this, the present study sought to analyse doctorate students’ attitudes towards AI tools by addressing two research questions, namely (a) what are the most relevant obstacles to research when using AI tools and (b) what attitudes students have towards research developing applications, artificial intelligence technologies in this case? To answer these queries, an explorative case study was conducted with EFL doctorate students using a quantitative approach, of a non-experimental design and online surveys were sent to the research participants using google forms in order to collect the needed data. To gain an insight on the experiences of AI tools in research, this paper, begins with providing a literature review on AI, ChatGPT, and its contribution in education in general and academic research in particular.. This is followed by the methodology, finding and results. Finally, the discussion and conclusion are provided.

2. Literature Review

In order to synthesize the literature within the field of AI with a focus on doctorate students’ attitudes on its use in academic research, the researcher grouped our literature into two main parts. We first discussed the literature that explores AI and then discussed the literature that looks at attitudes about using AI in academic research.

2.1 The Notion of Artificial Intelligence

AI is a broad branch of computer science and it involves many difference terms including machine learning, robotics, reinforcement learning, computer vision, and speech recognition (Dawson *et al.*, 2019). In its simplest meaning, AI involves using computers to do things that usually require human intelligence. In this line of thought, Popenici and Kerr (2017, p.2) define AI as “computing systems that are able to engage in human-like processes such as learning, adapting, synthesizing, self-correction and use of data for complex processing tasks”. In order for computers to achieve these capabilities, they require lots and lots of data. In fact, large data sets allow AI algorithms to identify patterns, make predictions and recommend actions (Aldoseri *et al.*, 2023). Though AI is all around us (e.g. google maps, amazon, NETFLIX, social media apps...), today’s best AI still cannot compete with the human brain in some ways, a fact that makes its use questionable and debatable among scientists, researchers and academics.

The sections that follow will focus on one AI tool which is named ChatGPT and its contributions in education and academic research.

2.2 ChatGPT

It is undeniable that ChatGPT has become widely known and used by students, teachers, researchers and academics in today's fast-paced, tech-driven world that we should be aware of its notion, impact and how much we should depend on it.

2.2.1 ChatGPT and Education: An overview

ChatGPT is a conversational AI-powered Chabot which enables users to engage in human-like conversations and responses to questions in natural language using deep learning (Ortiz, 2023). This AI tool was released in November 2022 by OpenAI, a company specializing in AI and research, using a state-of-the-art language programmed model and a large dataset (Wang et al., 2023). Its huge data set, personalization, and scalability make it distinctive from other chatbots and AI tools used in education. In point of fact, students and teachers find its use useful in several educational contexts as it has the potential to significantly improve learning and pedagogical experiences in a variety of ways (Grassini, 2023). According to Loos et al., (2023), it is handy for teachers in making lesson plans and syllabi, designing tests, reviewing intricate content, giving translations, and creating more engaging classroom assignments and activities. Therefore, ChatGPT reduces teachers' workload in a way that improves learning outcomes and the educational system as a whole. With regard to students, it provides them with answers, personalized tutorial sessions, summaries of lectures, and practice in speaking, writing and comprehension.

2.2.2 ChatGPT and Academic Research

When dealing with academic research, more typically, literature review outline, synthesis, systematic review and the like either as a chapter of a PhD thesis or in a literature review paper, researchers including doctorate students usually struggle with what literature to consider, how to organize their resources, how to set an outline from all the research available... etc. Nowadays, however, doing so is much easier than before thanks to AI tools, chatGPT in this case. This is mainly because ChatGPT helps researchers to write and organize a better literature review, be more critical in writing their synthesis, and more importantly consume less time in reading, organizing and reviewing the literature to eventually write a review of the related literature (Marjit, 2023).

With AI writing tools, novice researchers, namely doctorate students, can get feedback on various aspects of their writing, such as grammar, vocabulary, syntax, content, and structure (Hosseini et al., 2023; Thorp, 2023). In essence, these tools assist doctorate students, for example, in identifying and rectifying errors more proficiently and grasp basic writing concepts which guide them in boosting up their writing (Akgun & Greenhow, 2022; Nazari et al., 2021). Besides this, there are AI writing tools which can offer immediate feedback and suggestions for restructuring writing at the sentence and paragraph level, thus helping these students in arranging ideas effectively and achieving coherence and logical flow of ideas in their writing (Chang et al., 2021).

Although ChatGPT is advantageous for academic research and writing, it is also important to point out how researchers should use ChatGPT in their research works ethically and what dos and don'ts they should consider while using AI tools (Bankins & Formosa, 2023). Initially, it can limit students' reading, writing, and comprehension abilities which could potentially impair their cognitive abilities, such as their capacity to write and research. Above and beyond, the overreliance on ChatGPT in searching and writing everything can and encourage cheating (Bankins & Formosa, 2023). Therefore, it is really important not to use chatGPT to write entire sections, sub-sections, texts or paragraphs as its extensive datasets, for instance copyrighted materials which raises the potential for violating intellectual property rights that can be easily detected by nowadays' anti-plagiarism softwares for being similar to existing works, a fact that could lead to serious copyright issues. One more issue with Chat GPT is its occasional struggle to fully understand the context of a chat. Even though it is capable at grasping individual questions, it might struggle to retain past interactions, a fact which results in inapt, unconnected or irrelevant responses (AI Mind, 2023). Another aspect that researcher should consider while using AI tools is that these tools are limited in the information that they got since the updating system of data on them is not regular per-month or year (Verma, 2018). This means that when there might some new research insights or some things that have been changed slightly, ChatGPT for example may not have been updated upon.

On the other hand, there is no doubt that AI tools of research, ChapGPT in particular, is an incredible research tool that can speed all the literature process from finding ideas to finding the appropriate texts, essays, articles and books; reading them; organizing them; and finally writing the literature review.

3. Methodology

The subsections below are meant to present the research design, the data collection technique and instrument, results and discussion.

3.1 Research Design

The research used a quantitative approach. This is because data were collected, processed and analyzed numerically using the Likert scale. The obtained numerical data are linked to the level of students' attitudes towards artificial intelligence technologies regarding their academic research realization. It is worth noting that the research has a non-experimental cross-sectional design seeing that no experiment or action was put into effect on the variable under analysis, namely, student's attitude towards artificial intelligence technologies. The research is also cross-sectional given that the data were collected in a single period of time, i.e., the second semester of the academic year 2022-2023.

3.2 Data Collection Technique and Instrument

The technique used in the present study is the survey and the employed research instrument is the questionnaire. The latter was adapted from the questionnaire designed by Barrios and Ulises (2020) in their research on the attitude towards research in university. The

questionnaire used in the current study aims at determining the level of attitude of EFL doctorate students and it is composed of two dimensions: ‘positive perception’ and ‘negative perception’. Typically, the positive attitude facet seeks to identify the level of “research abilities” (S1, S5, S9, S13, S17, S21, S25) and "Positive assessment" (S4, S8, S12, S16, S20, S24, S28) that students assign to research. Whereas, the negative facet seeks to identify the level of "Research Barriers" (S2, S6, S10, S14, S18, S22, S26) and “negative assessment” (S3, S7, S11, S15, S19, S23, S27) that students allocate to research (see Appendix). The questionnaire uses a 4-point Likert scale, where the lowest score of 0 indicates “strongly agree”, a score of 1 indicates “agree”, a score of 2 indicates “disagree” and the highest score of 3 indicates “strongly disagree”. The Table below outlines the both the dimensions and their relevant categories together with the associated items of the questionnaire.

4. Results and Discussion

The analysis of the obtained results is going to be outlined in tables, first per-category and then per-dimension. Initially, table 1 shows the results corresponding to sentences S1, S5, S9, S13, S17, S21 and S25, i.e., the category of ‘Research skills’. Based on the outlined results, the percentages of the variants ‘strongly agree’ and ‘agree’ are grouped and so are those of ‘disagree’ and ‘strongly disagree’. The obtained results reveal that knowing how to organize (S17), knowing how to write (S9), knowing how to make decisions (S21) and knowing how to work in a team. (S5) are the four top research skills that students consider important in conducting research. Similar results were found by Barrios and Ulises (2020) who uncover that the leading skills to develop research are: knowing how to use the APA (American Psychological Association) format, knowing how to synthesis and write literature review, and knowing how to organize ideas and sections in a research work.

Table N°01: Research Skills Results

Research Skills Sentences	S1	S5*	S9*	S13	S17*	S21*	S25
SA+A	84.375%	91.625%	96.875%	80.250%	100.000%	98.875%	61.500%
D+SD	15.675%	8.375%	3.125%	19.750%	0.000%	2.125%	38.500%

The subsequent results are of the category ‘Positive assessment towards research", i.e. sentences S4, S8, S12, S16, S20, S24 and S28. Similarly, the percentage of the responses ‘strongly agree’ and ‘agree’ are grouped as well as those of ‘disagree’ and ‘strongly disagree’ (see Table 2). In the course of this comparison of results, it was found that research according doctorate students contributes in: Strengthening ethics (S4), Fostering creativity (S8) and Making thought more flexible (S24) to a greater extent. While they consider to a lesser extent that research contributes to improving frustration tolerance (S28). Nevertheless, the findings in Saavedra and Adelí Olortegui’s research work (2018) which tackles the factors associated with the attitude towards research do not coincide with the results analysed above seeing that

Saavedra and Adelí Olortegui point out that the availability of work time, the number of books or articles read per week and participation in training are the most important skills involving research.

Table N°02: Positive Assessment towards Research

Positive Assessment Sentences	S4*	S8*	S12	S16	S20	S24*	S28
S A+ A	100.000 %	100.000%	92.750%	95.750%	83.375%	100.00%	63.625%
D + S D	0.000%	0.000%	7.250%	4.250%	16.625%	0.000%	36.375%

Then the results as to sentences S2, S6, S10, S14, S18, S22 and S26 were analyzed (Table 3). They are of ‘Research’ Barriers category. It is worth noting again that the percentages of students’ responses to ‘strongly agree’ and ‘agree’ were combined and the same is applied for the percentages of ‘disagree’ and ‘strongly disagree’. When gazing at the results pinpointed in Table 4, it is possible to identify that time (S6), lack of knowledge (S14) and the economic aspect (S2), representing 70.750%, 66.625% and 60.375% respectively, are top three obstacles to conducting research for doctorate students. While the lack of support from teachers (S10) and the lack of credibility (S26) are deemed less problematic from them. Parallel findings were reported by Rocha et al. (2022). In their study, it was uncovered that lack of economy and little support from professors which result in negative emotions towards research (e.g. feeling tedious, boring and stressful) are the main students’ barriers to research.

Table N°03: Barriers to Research Results

Research Barriers Sentences	S2*	S6*	S10	S14*	S18	S22	S26
S A+ A	60.375%	70.750%	36.500%	66.625%	50.125%	43.750%	30.250%
D + S D	39.625%	29.250%	63.500%	33.375%	49.875%	56.250%	69.750%

Finally, the category ‘Negative Assessment towards Research’ was analysed. This category involves S3, S7, S11, S15, S19, S23 and S27. After grouping the percentages relating to ‘strongly agree’ and ‘agree’ and of ‘disagree’ and ‘strongly disagree’ in Table 5, it appears that the factors valued as most negative by students are ‘considering the research difficult’ (S15) and ‘considering the research tedious’ (S19) while the other aspects like S7, S11, and S23 have not been evaluated with a significant statistical negative assessment. However, in the study of Estrada et al. (2021) students appear to relate their negative attitude to research to their limited mastery of research methodology and to their teachers’ application of new didactic strategies.

Table N°04: Negative Assessment towards Research

Negative Assessment Sentences	S3	S7	S11	S15*	S19*	S23	S27
S A+ A	24.000%	4.125%	4.250%	57.375%	54.125%	6.250%	41.625%
D + S D	75.000%	95.875%	95.750%	42.625%	45.875%	93.750%	58.375%

In discussing the attained results, the researcher sought to cross-tab the results of the dimension 'positive perception'. That is the results of both 'research skills' and 'positive assessment towards research' categories. In so doing, it was found out that t out of the 31.3% of students who show a high level in "research skills", 21.9% of students show a "regular level" and 9.4% show a "high level" towards using artificial intelligence technologies in research. Whereas, out of the 28.1% of students who show a low level in "research skills", 15.6% of students show a "fair level" and 12.5%, show a "low level" regarding the positive assessment towards research.

Similarly, when the researcher cross-tabs the obtained results from 'research barriers' and 'negative attitudes towards research' categories. This is the dimension of 'negative perception' results. It was uncovered that out of the 28.1% of students who show a high level of "Research Obstacles", 15.6% indicate a "high level", 6.3% reveal a "regular level" and 6.3% demonstrate a "low level" with respect to the negative assessment towards research while using artificial intelligent technologies. While the students who show a "low level" of "Obstacles for research" (28.1%), they all show a "low level" with respect to the negative assessment of research. Eventually, the findings of the cross tabulation of gained results from each dimension, namely, 'positive perception' and 'negative perception', the main research findings point to having 34.375% students with high attitude, 31.250% with regular attitude, and 34.375% with low attitude.

Eventually, the finding of this study are deemed useful for students, teachers, principals looking for the skills and the aptitude researchers in general and doctoral students in particular are in need to develop and reinforce in a way or another their research taking skills while using artificial intelligence applications and to stir towards the progress and growth of all activities and production involving scientific success and attainment in the university context. In the end, it is worth mentioning that the study has some limitations. First, the research informants are only 14 EFL doctorate students. Hence, expanding the sample and considering other specialties will provide more representative results. Second, the study used only one research instrument, a cross-sectional survey, which can be a limitation because students' answers may be affected by academic desirability or may not truly reflect the respondents' feelings and ideas. Therefore, further research can address a lager sample with diverse specialties and involve additional research instruments like interviews and document analysis

to find out for example if the skills and perceptions are the same or different when doing research with artificial intelligence technologies/applications.

4. Conclusion:

This study was conducted to find out the level of doctorate students' perception towards the use of artificial intelligence technologies in doing research. After analyzing and discussing the results attained from the cross-sectional survey used in this investigation, the data involving the positive perception dimension results indicate that setting, writing, making decisions are significant skills to carry out research through the use of artificial intelligent technologies or applications. In addition to this, it was found that time constraints, the lack of knowledge and the lack of economic incomes stand as top barriers to research. Eventually, it was recognized that most of research informants have a low or regular attitude towards the use of artificial intelligence tools in research students since only a quarter of the research participants have a high attitude towards them. On account of those research findings, it can be concluded that university principals are in need to execute institutional policies that would raise doctoral students' perception and teachers/supervisors' aptitude towards research activities especially that research nowadays pertains emerging technologies, artificial intelligence in this case. On account of this finding, the study calls for an urgent need to execute institutional policies that would raise doctoral students' knowledge and academics' aptitude towards the current trends in research methodology and that would strengthen the development and the growth of scientific production in the university context especially that research nowadays pertains emerging technologies, artificial intelligence in this case.

Bibliography

AI Mind, 2023, "The 3 main problems with Chatgpt", Available on [\[https://pub.aimind.so/the-3-main-problems-with-chat-gpt-45dce8524ad9\]](https://pub.aimind.so/the-3-main-problems-with-chat-gpt-45dce8524ad9), (14/11/2023).

AKGUN, Selin, and GREENHOW, Christine, 2022, "Artificial intelligence in education: Addressing ethical challenges in K-12 settings" [online], *AI and Ethics*, n°2 (3), p. 431–440. Available at < <https://doi.org/10.1007/s43681-021-00096-7> > [consulted on: 13/12/2022].

ALDOSERI, Abdulaziz, KHALIFA, Al-Khalifa, and HAMOUDA, Abdel Magid, 2023, "Re-thinking data strategy and integration for artificial intelligence: concepts, opportunities, and challenges" [online], *Applied Sciences*, n° 13 (12), p.7082. Available at <<https://www.mdpi.com/2076-3417/13/12/7082>> [consulted on: 13/12/2023].

BANKINS, Sarah, and FORMOSA Paul, 2023, "The Ethical Implications of Artificial Intelligence (AI) For Meaningful Work" [online], *Journal of Business Ethics*, n° 185 (4), p. 725-740. Available at <<https://link.springer.com/content/pdf/10.1007/s10551-023-05339-7.pdf>> [consulted on: 22/07/2023].

BARRIOS, Erika, and ULISES, Delgado, 2020, "Design and validation of the questionnaire Attitude towards research in university students " [online], *Revista Innova*

Educación, n° 2 (2), p. 280-302. Available at <<https://doi.org/10.35622/j.rie.2020.02.004>> [consulted on: 22/07/2023].

CHANG, Tsung-Shu Yitong Li, HUANG, Hui-Wen, and WHITFIELD, Beth. 2021, "Exploring EFL students' writing performance and their acceptance of AI-based automated writing feedback." In *Proceedings of The 2nd International Conference on Education Development and Studies*, p. 31-35. Available at <<https://doi.org/10.1145/3459043.3459065>>

DAWSON, Dave, SCHLEIGER Emma, HORTON Joanna, MCLAUGHLIN John, ROBINSON Cathy, QUEZADA George, SCOWCROFT Jane, and HAJKOWICZ Stefan, 2019, *Artificial intelligence: Australia's ethics framework-a discussion paper*, Data61 CSIRO, Australia, 78p. Available at https://web.archive.org/web/20190721185405/https://consult.industry.gov.au/strategic-policy/artificial-intelligence-ethics-framework/supporting_documents/ArtificialIntelligenceethicsframeworkdiscussionpaper.pdf

ESTRADA, Araoz, Edwin, Gustavo, CORDOVA, Amesquita, Flavio, Edgar, GALLAGOS, Ramos, Néstor, Antonio, and MAMANI, Uchasara Helen Juddy, 2021, "Attitude towards scientific research in Peruvian students of pedagogical higher education" [online], *Apuntes universitarios*, n° 11 (3), p. 60-72. Available at <<https://doi.org/10.17162/au.v11i3.691>> [consulted on: 24/02/2023].

GRASSINI, Simone, 2023, "Shaping the future of education: exploring the potential and consequences of AI and ChatGPT in educational settings" [online], *Education Sciences*, n° 13 (7), p. 692. Available at <<https://doi.org/10.3390/educsci13070692>> [consulted on: 14/11/2023].

HOSSEINI, Mohammad, RASMUSSEN Lisa M., and RESNIK, David B, 2023, "Using AI to write scholarly publications" [online], *Accountability in research*, p. 1-9. Available at <<https://doi.org/10.1080/08989621.2023.2168535>> [consulted on: 14/11/2023].

LOOS, Eugène, Gröpler, Johanna, and GOUDEAU, Marie-Louise, Sophie, 2023, "Using ChatGPT in education: human reflection on ChatGPT's self-reflection" [online], *Societies*, n° 13 (8), p. 196. Available at <<https://doi.org/10.3390/soc13080196>> [consulted on: 14/11/2023].

MARJIT, Ujjal, 2023, "The Best 8 Ai-Powered Tools for Literature Review." *Researchers site*. Available on [<https://researchersite.com/the-best-8-ai-powered-tools-for-literature-review/>], (14/11/2023).

NAZARI, Nabi, SHABBIR, Muhammad, Salman, and SETIAWAN, Roy, 2021, "Application of Artificial Intelligence powered digital writing assistant in higher education: randomized controlled trial" [online], *Heliyon*, n° 7 (5). Available at <<https://doi.org/10.1016/j.heliyon.2021.e07014>> [consulted on: 05/12/2022].

ORTIZ, Sabrina, 2023, "What is ChatGPT and why does it matter? Here's what you need to know". Available on [<https://www.google.com/amp/s/www.zdnet.com/google-amp/article/what-is-chatgpt-and-why-does-it-matter-heres-everything-you-need-to-know/>], (14/11/2023).

POPENICI, Stefan AD, and KERR Sharon, 2017, "Exploring the impact of artificial intelligence on teaching and learning in higher education" [online], *Research and practice in technology enhanced learning*, n°12 (1), p. 22. Available at <<https://doi.org/10.1186/s41039-017-0062-8>> [consulted on: 05/12/2022].

ROCHA, Nelly, CALCINA Carmen, SUCARI Wilson, ESTEVES Angela, and LUJANO Yolanda, 2022, "Attitude and disposition: two key elements for the investigation" [online], *Apuntes Universitarios*, n°12 (2), p. 250-264. Available at <<https://doi.org/10.17162/au.v12i2.1049>> [consulted on: 10/12/2022].

SAAVEDRA, Pamela, Chara, and ADELI Olortegui, Luna, 2018, "Factors associated with the attitude toward research in university nursing students" [online], *Casus: Revista de Investigación y Casos en Salud*, n°3 (2), p. 83-88. Available at <<https://doi.org/10.35626/casus.2.2018.73>> [consulted on: 24/02/2023].

THOR, Holden, 2023, "ChatGPT is fun, but not an author" [online], *Science*, n° 379 (6630), p. 313-313. Available at <<https://doi.org/10.1126/science.adg7879>> [consulted on: 10/12/2023].

VERMA, Mudit, 2018, "Artificial intelligence and its scope in different areas with special reference to the field of education" [online], *International Journal of Advanced Educational Research*, n°3 (1), p.5-10. Available at <<https://files.eric.ed.gov/fulltext/ED604401.pdf>> [consulted on: 14/11/2022].

WANG, Fei-Yue, Miao, QINGHAI Xuan, Li, WANG, Xingxia, and LIN, Yilun, 2023, "What does ChatGPT say: The DAO from algorithmic intelligence to linguistic intelligence" [online], *IEEE/CAA Journal of Automatica Sinica*, n°10 (3), p. 575-579. Available at <<https://doi.org/10.1109/JAS.2023.123486>> [consulted on: 06/12/2023].

Appendix

Dear student, this questionnaire aims at identifying the level of attitude towards the use of artificial intelligence technologies in research.

Instructions:

Read each sentence below put a cross (X) in the box that you deem convenient and appropriate.

The information collected will be used solely for research purposes. Your participation will be kept anonymous, and your identity will not be revealed under any circumstances.

	Sentences	Strongly agree	Agree	Disagree	Strongly disagree
S1	I must know how to use the APA format to do research with artificial intelligence applications.				
S2	The lack of money is my biggest problem to do research to do research with artificial intelligence applications				
S3	It seems to me that doing research using artificial intelligence applications is boring				
S4	Doing research through to do research with artificial intelligence applications strengthens professional ethics				
S5	I must know how to work in a team to do research with artificial intelligence applications				
S6	The lack of time is my biggest problem to do research to do research by means of artificial intelligence applications				
S7	It seems to me that doing research through to do research with artificial intelligence applications is not something interesting				
S8	Doing research with artificial intelligence applications encourages creativity				

S9	I must know how to write to do research in the development of augmented reality applications				
S10	The lack of support from my teachers is a problem for doing research by means of artificial intelligence applications				
S11	It seems to me that doing research using artificial intelligence applications is not necessary for my profession				
S12	Doing research with artificial intelligence applications develops responsibility				
S13	I must know a second language to do research through artificial intelligence applications				
S14	The lack of knowledge is an obstacle to doing research with artificial intelligence applications				
S15	It seems to me that research with artificial intelligence applications is difficult				
S16	Doing research to do research with artificial intelligence applications makes you more engaged				
S17	I must know how to organize to do research with artificial intelligence applications				
S18	The lack of support from my school is an obstacle to doing research through artificial intelligence applications				
S19	It seems to me that doing with artificial intelligence applications is tedious				
S20	Doing research with artificial intelligence applications develops				

	personal security				
S21	I must know how to make decisions while doing research through artificial intelligence applications				
S22	The lack of information is the reason why I do research by means of artificial intelligence applications				
S23	It seems to me that research is easily done with artificial intelligence applications				
S24	Doing research with artificial intelligence applications makes thinking more flexible				
S25	I must use anti plagiarism softwares to do research through with artificial intelligence applications				
S26	Lack of credibility as a student is why I don't do research with artificial intelligence applications				
S27	I find that doing research with artificial intelligence applications is stressful				
S28	Doing research through artificial intelligence applications develops a tolerance for frustration				