



## HIGHER EDUCATION STUDENTS' VIEWS ON THE USE OF ARTIFICIAL INTELLIGENCE FOR TEACHING STUDENTS WITH SPECIFIC LEARNING DISABILITIES

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### **Abstract:**

This research attempts to present the perspectives of higher education students regarding the use of Artificial Intelligence (AI) in language teaching interventions, with an emphasis on secondary education students with Specific Learning Difficulties (SpLDs). Although AI applications are associated in the literature with Education (AIED), the interest of the research community was revived in 2022 with the release of ChatGPT. This Large Language Model can generate text and quickly attract millions of users. This triggered expectations for potential benefits but also raised concerns about potential risks that may arise in the context of Special Education and Training (SET). Considering the above, the methodology utilized a mixed analysis of an online questionnaire administered to 120 students from "language" departments in Greece (Kalamata). In the results, expectations for skill improvement were expressed, but there were also concerns about providing ready-made answers. In addition, students expect resistance from parents and colleagues but support from the students themselves. The research highlighted the expected barriers and facilitators that students perceive they will encounter, of which the need for staff training was emphasized.

**Keywords:** artificial intelligence, special education and training, specific learning disabilities, literature students' views, TISIPfSENDS

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## 1. Introduction

"Artificial Intelligence" was first introduced in 1956 and referred to the simulation of human behavior by machines. Soon, the term essentially shifted from the encoding of human thought, from the 2010s onwards, to the management of "big data", meaning large digital data resources. Artificial Intelligence (AI) permeates every aspect of human activity and, therefore, both education and people with disabilities through assistive technologies (Mackenzie, 2017; Ohlsson & Spada, 1993; Papert, 1980; Yu & Sung 2002). Among AI applications, language models have stood out in recent years for their popularity and rapid development. These are applications that can edit and create text at high speed by interacting with users. A landmark for language models was the ChatGPT application, developed and released by OpenAI in November 2022. Soon, the app attracted global technological and research interest, a development that raised expectations and concerns about its use in education (Stokel - Walker, 2023; Fuchs, 2023, Alpaydin, 2016).

It is, after all, a fact that New Technologies (NTs) are now part of students' lives, including those who experience SpLDs. Particularly in the field of Special Education and Training (SET), as noted by Christakis (2011), the goal is to integrate students with SpLDs, such as dyslexia and dysgraphia, which requires the availability of individualized intervention programs. This means that the interventions provided in the context of SET need to be individualized and appropriately adapted based on the individuality, particular characteristics, and interests of the students. Therefore, considering that NTs are part of the lives of students with SpLDs, it becomes clear that they cannot be ignored by individualized interventions (Tzimogiannis, 2017, 2019; Christakis, 2000, 2011; Drossinou & Alexopoulos, 2023a). To promote inclusion in the context of SET, certain pedagogical tools are utilized in teaching interventions.

In the literature, among the intervention tools provided, the TISIPfSENDs pedagogical tool is associated with successful interventions for students with SpLDs . This tool arises from the representation of pedagogical concepts and considerations that are constructed in practices such as Targeted Individually Structured, Differentiated Teaching, and Integrative Intervention Programs for Students with Special Educational Needs, collectively defined by the acronym TISIPfSENDs. Utilizing the pedagogical principles of teamwork, learner-centeredness and the Curriculum Framework for Special Education, it emphasizes the adaptation of each step of teaching intervention to the specific characteristics of each student. These specific characteristics include age, interests, levels of autonomy, and levels of learning readiness in certain neurodevelopmental areas such as oral speech, psychomotor skills, mental abilities, and emotional organization, as well as levels of understanding texts (Drossinou Korea, 2020, 2023, 2024; Christakis, 2011).

It is worth mentioning that the literature is relatively sparse in linking AI applications, especially Large Language Models (LLMs), with SET and its goals. However, by attempting to link SpLDs and AI, emerging expectations may highlight

individualization and provide assistance to students and teachers, improving students' skills with an emphasis on written and oral expression, teamwork, and creativity. On the other hand, emerging risks highlight issues of privacy, lack of personalization, discrimination against groups, lack of human contact, misinformation, copying, addiction and accessibility (Drossinou & Alexopoulos, 2024, 2023b).

Therefore, as shown by the above considerations, an appropriately targeted and differentiated use of AI applications for students with SpLDs could be beneficial. An early mapping of potential benefits and risks could contribute to a safer and more effective use of these applications, limiting any possible risks (Luckin *et al.*, 2016; Chaudhry & Kazim, 2021; Ahmad *et al.*, 2022; Celik *et al.*, 2022; Muljono *et al.*, 2017). The present research aims to fill the literature gap by exploring the views of humanities and cultural sciences students in higher education, who constitute the pool of future literature teachers in secondary education. After all, some of them will be asked to apply these technologies in their teaching interventions. The research could also contribute to their preparation, ensuring they are ready for the obstacles and difficulties they may face in teaching practice. It is worth noting that university students are usually closer in age to secondary school students and have views on SpLDs. Exploring their views could also reflect more transparently the needs of students with SpLDs.

## 2. Purpose and Research Questions

The present research explores the views of future secondary teachers – literature students – on the pedagogical use of AI applications in teaching interventions for students with SpLDs, attempting to fill the gap in the literature. The research questions are as follows: [1] What are their views on the potential [a] benefits and [b] risks of using AI applications in language teaching interventions with the pedagogical tool TISIPfSENDS for students with SpLDs? [2] What are their views on the reaction of [a] the educational community and [b] the students, including those with SpLDs, who utilize the TISIPfSENDS pedagogical tool in exercises of graded difficulty during a specific step of teaching intervention in language courses with AI applications? [3] What are their views on the possible [a] obstacles and [b] facilitators they may face when using AI applications in language teaching interventions with the pedagogical tool TISIPfSENDS for students with SpLDs?

## 3. Methodology – Research Sample

For this research, an online questionnaire was created and given to 120 students from the humanities and cultural studies departments (departments, from which you can, upon graduation, teach language subjects in secondary education) in Greece. The questionnaire included demographic questions, closed multiple-choice questions with non-mutually exclusive answers, as well as open questions. Mainly, open-ended questions were chosen, as the topic is a literature-uncharted field. The students came from the Department of

Philology and the Department of History, Archaeology, and Cultural Resources Management at the University of Peloponnese (Kalamata). They were attending courses in SET, offered in the 5<sup>th</sup>, 6<sup>th</sup> and 8<sup>th</sup> semesters, with a focus on "Teaching Students with Specific Learning Difficulties (dyslexia) I" (purposive sampling). To answer the research questions, phenomenology was chosen, adhering to principles set for educational research methodology (Cohen *et al.*, 2017), as it focuses on the deeper meaning of a phenomenon or experience as experienced by the subjects, with criteria set in the scientific thematic analysis.

The research was conducted from October 2023 to June 2024. Of the 120 participants, the majority were female (92, 76.67%), while only 28 were male (23.33%). Most of them came from the Department of Philology (69, 57.50%), while 51 came from the Department of History, Archaeology, and Cultural Resources Management at the University of Peloponnese. Furthermore, 93 (77.50%) were up to 30 years of age (18-30 years), 6 were between 31-40 (5.00%), 13 were between 41-50 years of age (10.83%), and only 8 were over 50 years of age (6.67%). Finally, all participants were permanently living in Greece.

#### 4. Data Analysis

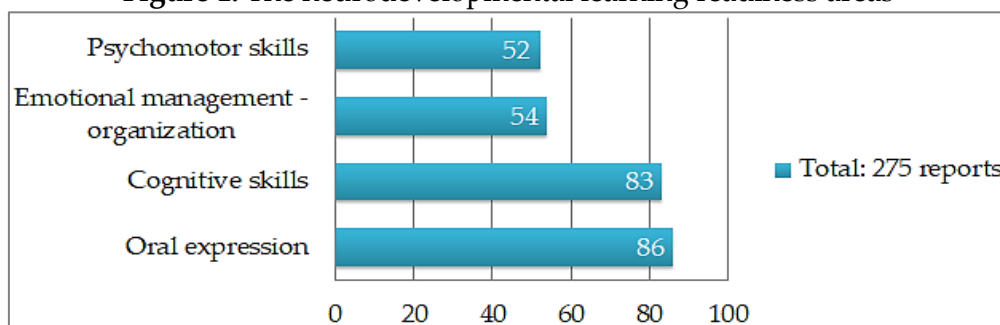
The coding of the data was based on the thematic sections of the questionnaire, with each section corresponding to a research question. At a second level, the coding proceeded to grouping into thematic areas (based on the scientific thematic analysis) as defined by the research questions. The data were collected using specific words and phrases denoting certain meanings, and these phrases were the unit of analysis. The data were analyzed qualitatively, with some quantification (mixed analysis). The initial coding led to further thematic analysis to highlight the main ideas of the verbal material. For the presentation and comparison of the results, the frequency of references in the responses (N) and the relative frequency (N%) were used. Furthermore, indicative descriptive responses helped enrich the results of the survey, whose reliability was ensured by an independent researcher.

#### 5. Results

##### 5.1 Potential Benefits and Risks in Teaching Language Interventions

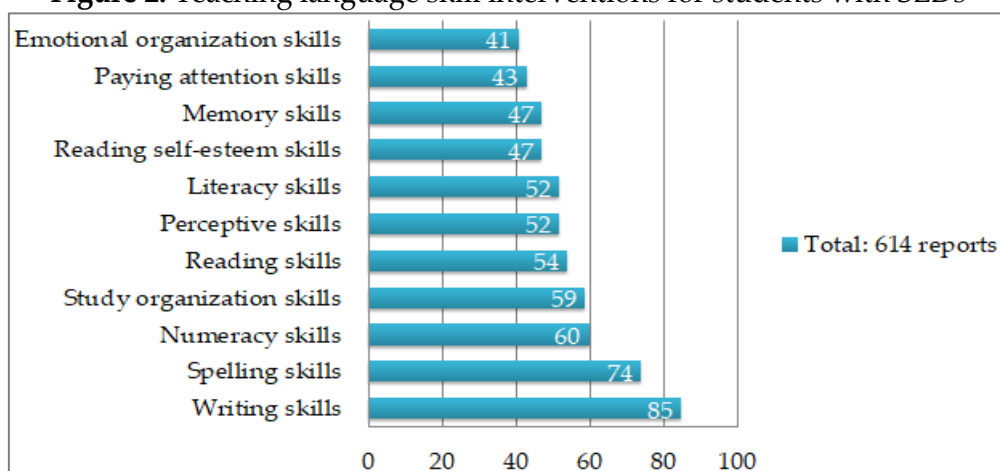
In an attempt to explore the possible benefits and risks that may arise from the use of AI applications for students with SpLDs, it was determined that two multiple-choice questions should be included in the questionnaire, following the demographic questions. In the first question, students were asked to select the neurodevelopmental areas of learning readiness they thought could be enhanced through multisensory learning readiness activities using AI during teaching language interventions (Figure 1). The given options were taken from the SET teacher's book in Greece (Hellenic Pedagogical Institute, 2009).

**Figure 1:** The neurodevelopmental learning readiness areas



As shown (Figure 1), the respondents consider that AI applications could be used in interventions in language classes in order to enhance mainly oral expression (N=86, N%=31.27%), as well as the cognitive abilities of students with SENDs (N=83, N%=30.18%). Fewer expectations were expressed for the enhancement of emotional organization (N=54, N%=19.64%) and psychomotor skills (N=52, N%=18.91%).

**Figure 2:** Teaching language skill interventions for students with SLDs



Then (Figure 2), students were asked to select, through non-mutually exclusive choices, those skills in which, in their opinion, AI applications could be useful. These skills have been included in the Experimental Curriculum for Specific Learning Difficulties (Dyslexia), developed by the Department of Special Education at the Pedagogical Institute of Greece (Markakis & Drossinou Korea, 2001). As it was revealed, students felt that mainly written expression (N=85, N%=13.84%) and spelling (N=74, N%=12.05%) skills could be supported, while fewer expectations were reflected for numeracy skills (N=60, N%=9.77%), personal study organization skills (N=59, N%=9.61%), reading skills (N=54, N%=8.79%), perceptual (N=52, N%=8.47%) and writing skills (N=52, N%=8.47%), reading self-esteem (N=47, N%=7.65%) and memory skills (N=47, N%=7.65%). Even fewer expectations were expressed for attention concentration skills (N=43, N%=7.00%) and emotional organization (N=41, N%=6.68%). After the first mapping through closed-ended questions, open-ended questions were formulated regarding potential benefits and risks.

Therefore, the first part of the analysis includes codes regarding the benefits and risks expected by the students. After a qualitative analysis of the data, 324 references were obtained in this axis, divided into 22 codes in 2 subject areas (Table 1 and 2).

**Table 1:** Potential benefits of teaching language interventions

Categories	Codes	N	n%
1. Benefits	Enhancing skills (critical thinking, autonomy, spelling, creativity)	27	8.33
	Improvement in expression - communication	25	7.72
	Help with research – search	18	5.55
	Personalization	18	5.55
	Innovation (experiential, multimodal learning)	16	4.94
	Teacher's assistant	13	4.01
	Motivation of interest	9	2.78
	Improving self-image - self-confidence	9	2.78
	Technological literacy	8	2.47
	Understanding complex concepts	8	2.47
	Accessibility	3	0.93
Inspiration - providing ideas	2	0.68	
Total		156	48.15
		324	100

As the results reveal (Table 1 and 2), more university student references to potential risks (N=168, N%=51.28%) than to benefits (N=156, N%=48.15%) were identified. Focusing on the benefits (Table 1), it was found that university students mainly expect to enhance the skills of students with SpLDs through the use of AI applications in language teaching interventions (N=27, N%=8.33%). Specifically, this code included reports of enhancing students' critical thinking, autonomy, spelling and creativity (participant 17: "*Students will be able to develop their skills and sharpen their thinking*"). Furthermore, an almost equal number of reports (N=25, N%=7.72%) focused on improving communication skills, and written and oral expression skills (participant 27: "*They will be able to express themselves better in their oral and written skills*"). Equal numbers of reports (N=18, N%=5.55%) highlighted the use of these applications as useful tools for searching for information by providing immediate answers (participant 120: "*They can at any time find an answer to something they want to know!*").

In addition, some references (N=16, N%=4.94%) were identified about the promotion of innovative teaching approaches that foster an immersive and multimodal relationship with learning during the intervention (participant 20: "*It is more experiential learning and there is a variety of exercises*"), as well as for helping the teacher him/herself, given that these applications can suggest exercises and ideas (participant 33: "*Suggestions in education, suggestions for teaching planning and addressing difficulties that the teacher may be ignoring*"). Furthermore, respondents seemed to expect an increase in interest (N=9, N=2.78) and hence engagement of students with SpLDs (participant 3: "*I think they make the lesson more interesting and motivate the children to participate*"), but also to improve their self-confidence and self-image through the use of AI applications (N=9, N%=2.78%,

participant 21: *"The benefits are just the confidence and pride that the child will feel that he/she has finally done it on their own"*). Students also felt that exposing students with SpLDs to AI would improve their technological literacy skills (N=8, N%=2.47%), which are crucial in modern times (participant 22: *"They will gain useful technical and digital skills"*), while these applications could also be useful when solving questions and understanding complex concepts (N=8, N%=2.47%), through questions that students can ask themselves (participant 35: *"By asking questions, students can better understand things that without this tool were quite difficult for them"*). Finally, only 3 reports (N=3, N%=0.93%) focused on improving accessibility for these students (participant 29: *"They have easy and uninterrupted access, which is good"*), while 2 reports (N=2, N%=0.68%) found AI useful for providing inspiration and ideas (participant 53: *"(P50): "A child can be helped by getting ideas in an exercise or topic or even in short essays in paragraph form"*).

**Table 2:** Possible risks associated with teaching language interventions

Categories	Codes	N	n%
<b>2. Risks</b>	De-skilling due to ready-made answers	36	11,11
	Dependence – addiction	27	8.33
	Decreased critical thinking	25	7.72
	Misinformation	24	7.41
	Human absence – teacher's role	14	4.32
	Lack of personalization	13	4.01
	Confusion – distraction	11	3.40
	Copy to work	8	2.47
	Leakage of personal data	8	2.47
	Group bias	2	0.68
<b>Total</b>		168	51.85
		324	100

Moving on to the possible risks (Table 2), it is noted that the respondents highlighted as dominant (N=36, N%=11.11%) the risk of a general decrease in students' skills, as they will receive ready-made answers from these applications and will not think and try themselves (participant 8: *"If not used in the right way, the child may become complacent in a model of 'perfect ready answers' and stop trying, investigating on their own, and learning from their possible mistakes"*). Furthermore, several reports (N=27, N%=8.33%) focused on the risk of addicted use of such AI applications by students (participant 55: *"There is a risk that the student may become vulnerable to this new technology and not be helped; on the contrary, he/she may become addicted to this use"*). In fact, in several reports (N=25, N%=7.72%) there was a specific focus on a possible decrease in students' critical cognitive thinking (participant 65: *"Undoubtedly the use of the above-mentioned applications impedes the development of critical thinking and perceptual skills"*), as well as the risk of misinformation (N=24, N%=7.41%) through the provision of answers with incorrect information from the AI applications (participant 63: *"The risks are that all the information provided is not always reliable and that there is misinformation"*).

Furthermore, fewer reports (N=14, N%=4.32%) identified the lack of valuable human interaction and the risk of replacing the valuable teacher-student relationship with a mechanistic application-student interaction, which will holistically affect the student's skills (participant 95: *"The replacement of the role of the teacher and the lack of emotional intelligence by an impersonal machine"*). In addition, respondents highlighted (N=13, N%=4.01%) the production of standard, mechanistic answers that do not take into account the individuality of the student. In other words, they highlighted the lack of personalization in the responses (participant 75: *"Beyond the isolation of students [...], poor adaptation to the needs of children with EMDs"*) as a challenge arising from the pedagogical use of such applications (participant 75: *"Beyond the isolation of students [...], insufficient adaptation to the needs of children with SpLDs"*). Furthermore, 11 reports (N=11, N%=3.40%) highlighted the risk of confusion and distraction for students with SpLDs (participant 105: *"The risk of distraction!"*). An equal number of reports (N=8, N%=2.47%) focused on ethical issues due to the risk of copying answers to students' homework (participant 100: *"Deliberate copying in homework"*) and the possible lack of privacy of students' personal data. Particularly in cases of students with SpLDs, this data can be extremely sensitive as it involves medical diagnoses (participant 52: *"We have not considered the risk of leaking private information and stigmatization"*). Finally, only 2 reports (N=2, N%=0.68%) mentioned bias against or in favor of certain user groups through the answers provided by the apps (participant 23: *"The messages they give may be biased"*).

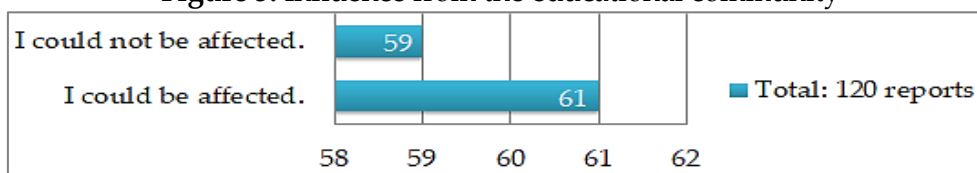
## 5.2 Educational Community – Student Reaction and Influences on Views

### 5.2.1 The Reaction of the Educational Community

In order to map the influence of the educational community, the subjects of the research were asked an introductory open-ended question regarding whether they are influenced by the views of the educational community on AI in SET. As shown in the results (Figure 3), the university students expressed an almost equally divided attitude. In particular, almost half of their responses (N=61, N%=50.83%) stated that the views of the wider educational community on AI in language interventions would influence their decision on whether or not to use these applications (participant 64: *"Research is important for this part and other people's views, but it is better to consult science and people who are involved in it as a profession, so I would be influenced by them, as I think"*). On the other hand, fewer reports (N=59, N%=49.17%) expressed a university student's trust in their own judgment in using such applications (participant 120: *"I don't rely on other people's personal opinions to form my judgment. Instead, my responses and decisions are based on the information I have been taught and I move with it"*).



**Figure 3: Influence from the educational community**



Then, the research proceeded to investigate the university students' perceptions, in order to answer the second research question about the expected support and resistance they believe they will face from parents, if they attempt to use AI applications in teaching interventions. In total, there were identified 292 reports distributed across 10 sub-codes and 2 broad theme areas (Table 3 and 4). Overall, more reports about resistance (N=166, N%=56.85%) were identified compared to reports about support (N=126, N%=43.15%).

**Table 3: Support from the educational community**

Categories	Codes	N	n%
<b>1. Support</b>	Support for those who find AI useful	116	39.73
	Support for teaching assistants	9	3.08
	Support due to growing interest	1	0.34
<b>Total</b>		126	43.15
		292	100

Focusing in particular on the expected support from parents and teacher-colleagues, it is noted that a total of 126 reports were identified, divided into 3 codes. More specifically, as shown in the results (Table 3), respondents primarily expect support from those who are generally supportive of the use of AI in education (N=116, N%=39.73%), considering that its applications can support children properly in language teaching interventions (participant 73: *"I think that most of the teachers who attempt interventions with tools such as TISIPfSEnDs perceive the use of applications such as ChatGPT in a positive way, because through it students are exposed to a lot of information and learn a lot. So do parents"*).

Furthermore, 9 references (N=9, N%=3.08%) were identified regarding support, as they believe that teachers will perceive it as a tool that will help them in their teaching work (participant 63: *"[...] because it can help teachers [...]"*). Finally, there was 1 report (N=1, N%=0.34%) of expected support, because it was considered that the educational community would recognize that it can increase students' interest and participation (participant 19: *"I think they will see it as another tool to increase students' interest"*).

**Table 4:** Resistance from the educational community

Categories	Codes	N	n%
<b>2. Resistance</b>	Resistance from them against AI	85	29.11
	Resistance due to lack of knowledge	28	9.59
	Resistance due to copying	20	6.85
	Resistance due to lack of personalization	14	9.79
	Resistance due to decrease in critical thinking	10	3.42
	Resistance due to wrong answers	7	2.40
	Resistance due to addiction	2	0.68
<b>Total</b>		166	56.85
		292	100

Moving on to the expected resistance from the educational community, it is noted that a total of 166 reports (N=166, N%=56.85%) were identified, divided into 7 codes (Table 4). As it was revealed from the results, university students mainly expect resistance from those who are generally against the use of AI applications in SET, considering that they will probably create greater difficulties for students with SpLDs rather than helping them (participant 113: *"The majority of teachers and parents are sceptical about the adoption of this technology"*). Fewer, but several reports (N=28, N%=9.59%) identified the view that they would meet resistance from members of the educational community, parents and teachers, who - due to lack of knowledge - reject AI or express a strongly sceptical attitude (participant 58: *"I think they are still sceptical about ChatGPT and this is understandable, every 'tool' needs time and study to handle it properly and get good results. Like anything new in education, ChatGPT will be tested in real life"*). Furthermore, in 20 reports (N=20, N%=6.85%) there was a mention of resistance from those who were cautious because of the risk of copying text in students' answers (participant 61: *"I think they perceive the use of ChatGPT negatively because they see it as copying text and nothing else"*).

Furthermore, 14 reports (N=14, N%=9.79%) were identified regarding resistance from those who consider that these applications provide mechanistic, formalized responses that do not take into account the specificities of students, undermining true human interaction and in particular the teacher-student relationship (participant 48: *"I think they perceive it more in a negative sense because communication and honesty between the student and the teacher is lost. For example, instead of the child asking the teacher, he/she asks the app"*). Copying answers without further thought could also cause resistance from those who are cautious regarding the risks of weakening students' critical thinking, according to 10 references (N=10, N%=3.42%, participant 78: *"It will be seen negatively because children lose their critical thinking"*). Finally, fewer reports (N=7, N%=2.40%) were identified for resistance due to providing incorrect answers, which can further confuse students with SpLDs (participant 74: *"There is skepticism and concern, they report errors in the outcome of these applications"*). Finally, only 2 references (N=2, N%=0.68%) to resistance from the educational community were detected about the fear of an addictive use by students (participant 80: *"[...] and by those who are also afraid of addiction"*).

### 5.2.2 Student's Reaction by Community Influences

Then, university students were asked questions regarding the reaction university students expect from students with SpLDs if they use AI applications in language interventions. As shown in the results (Table 5 and 6), a total of 123 references were identified, divided into 7 codes and 2 broad themes. Overall, strikingly more references to support from learners (N=109, N%=88.62%) than resistance (N=14, N%=11.38%) were detected. Focusing specifically on the expected support from students with learning difficulties, a total of 109 references (N=109, N%=88.62%) were detected, which were divided into 5 codes, as presented in Table 5

**Table 5: Support from students**

Categories	Codes	N	n%
<b>1. Support</b>	Interest-based support	55	44.72
	Support because of help	37	30.08
	Support due to ready answers	9	7.32
	Support due to familiarity with NT	7	5.70
	Support due to personalization	1	0.81
<b>Total</b>		109	88.62
		123	100

More specifically, most of the reports (N=55, N%=44.72%) mentioned support for the students with special learning difficulties in understanding texts, as AI applications could arouse their interest and enthusiasm (participant 91: *"I think it would make an impression on them and that they would like to investigate it and see what it is for"*). Furthermore, respondents felt that there would be support from the students as they would have a valuable assistant (N=37, N%=30.08%) during the intervention (participant 63: *" I think positively because it can help students with special needs to put their thoughts in order and get information in an easier way"*). Finally, fewer reports (N=9, N%=7.32%) mentioned support from students as they could "take advantage" of these AI tools to have "a ready-made solution" (participant 100: *"Because of the difficulties they face in language subjects, they use it as a solution, which is ineffective for themselves"*), but also for support, as students are already familiar with the NTs in their daily life (participant 60: *"It is based on technology they already use more or less every day"*). Finally, 1 report (N=1, N%=0.81%) referred to support as students will receive personalized responses (participant 118: *"They will be supported because these applications provide personalized assistance"*).

**Table 5: Resistance from students**

Categories	Codes	N	n%
<b>2. Resistance</b>	Resistance due to lack of knowledge - difficulties	12	9.76
	Resistance due to lack of personalization	2	1.63
<b>Total</b>		14	11.38
		123	100

On the other hand, 14 references (N=14, N%=11.38%) about resistance from students were also identified in the respondents' responses, which were divided into 2 codes (Table 6). In particular, most of these reports (N=12, N%=9.76%) mentioned resistance from those students who experience difficulties when using AI applications, which may be confusing for them (participant 114: "*Some students may feel insecure or anxious about using new technologies or experience difficulties in adjusting to them*"). Finally, 2 reports (N=2, N%=1.63%) focused on an expected resistance from students due to lack of personalization, as defined by the pedagogical tool TISIPfSENDS (participant 14: "*Students with more severe difficulties may perhaps need more traditional - individualized teaching methods and close support from their teachers*").

### 5.3 Barriers and Facilitators in Language Teaching

Opinions about the comprehension of texts with the use of artificial intelligence in teaching interventions for literature courses focus on potential [a] barriers and [b] facilitators using the TISIPfSENDS pedagogical tool for students with SpLDs. In order to answer the last research question of the present study, the last part of the analysis explored the obstacles as well as the facilitators that the respondents believe they will face when using AI applications in language teaching interventions. In particular, a total of 279 references were detected in their responses, divided into 18 codes and 2 subject areas (Table 7 and 8). It should be noted that respondents made more references to facilitators (N=144, N%=51.61%) than to obstacles (N=135, N%=48.39%).

**Table 7:** Barriers associated with the use of AI apps in tasks of graded reading difficulty at a specific teaching step

Categories	Codes	N	n%
<b>1. Obstacles</b>	Lack of knowledge	34	12,19
	Limited capabilities of AI applications	34	12,19
	Difficulties – student indifference	16	5,73
	Lack of communication – human interaction	14	5,02
	Parental resistance	13	4,66
	Copy	8	2,87
	Lack of equipment	5	1,79
	Colleague resistance	5	1,79
	Lack of time	4	1,43
	Risk of addiction	4	1,43
<b>Total</b>		135	48,39
		279	100

Focusing in particular on potential barriers, it is noted that the reports (N=135, N%=48.39) were divided into 10 codes. Among the most frequent obstacles, the majority of the reports (N=34, N%=12.19%) highlighted the lack of knowledge about the appropriate pedagogical use of AI applications in SET (participant 99: "*One challenge I might face when using AI applications in SET interventions is the difficulty in using such applications*"), as well as the limited features of the applications, such as the lack of personalization, according

to the pedagogical view of individuality (T[I]SIPfSEND) (participant 94: *"The use of language models, such as ChatGPT, in SET interventions may face some obstacles. The language models may not properly understand the specific needs of students with SET as they are designed for general use"*). Furthermore, some reports (N=16, N%=5.73%) focused on students' disinterest and the difficulty they may encounter (participant 85: *"Children with learning disabilities find it difficult to adapt to the rules of these apps"*). A total of 14 reports (N=14, N%=5.02%) highlighted the lack of human communication and contact as a barrier (participant 79: *"There will be obstacles to communication and interaction for these students"*), while 13 reports (N=13, N%=4.66%) noted resistance from the parents (participant 91: *"Parental resistance! Many parents either prefers to ignore or do not accept that their children are in need of SET interventions"*).

In addition, some participants mentioned (N=8, N%=2.87%) as a potential obstacle that students might tend to copy ready-made answers from the applications, which they may see as an "easy solution," thus lowering their skills (participant 21: *"I think there will be a big issue with copying in spelling mistakes, syntax, and how to express their thinking on paper"*). In addition, an equal number of reports (N=5, N%=1.79%) focused on the lack of technological equipment (participant 114: *"[...] lack of equipment and resources"*) and the reactions that can be caused by colleagues who are hesitant or negative about AI, with whom the literacy teacher will need to work during the intervention (participant 50: *"I think the main obstacle will be the fact that there will not be a common ground on which all teachers will walk in order to get the intervention right. Some people will disagree about AI"*). Finally, 4 reports (N=4, N%=1.43%) mentioned the lack of time (participant 103: *"A major difficulty is the time needed to learn about the tools and choose the most appropriate one"*) and the potential for dependent use by students with SpLDs (participant 107: *"Probably the addiction to the use of technology which is on the rise these days"*).

**Table 8:** Facilitations associated with the use of AI apps in tasks of graded reading difficulty at a specific teaching step

Categories	Codes	N	n%
2. Facilities	Further education	69	24.73
	Parental cooperation	20	7.17
	Collaboration between colleagues – teamwork	17	6.09
	I don't know / there are no obstacles	12	4.30
	Government support – support from management	10	3.58
	Student collaboration	9	3.23
	Technical support – equipment	5	1.79
	Differentiated Materials – TISIPfSENDS	2	0.72
Total		144	51,61
		279	100

Moving on to the views on facilitations that participants think they need to overcome the aforementioned obstacles, a total of 144 references (N=144, N%=51.61%) were identified, divided into 8 codes (Table 8). As revealed by the results, university students considered appropriate staff training (N=69, N%=24.73%, participant 26: *"I would need appropriate*

*further training*"), parental cooperation (N=20, N%=7.17%, participant 61: *"I would try to contact their parents and ask them to help their children learn how to use the app. I need the parents to be cooperative"*), as well as the cooperation of colleagues and the interdisciplinary team as a whole (N=17, N%=6.09%), which would be involved in the teaching intervention (participant 44: *"I would definitely need the support of parents, colleagues, and other employees working with the child"*). It is also worth noting that some participants reported (N=12, N%=4.30%) that, in their opinion, there were no difficulties (participant 59: *"I don't think I would encounter any challenges"*).

Finally, fewer reports (N=10, N%=3.58%) focused on the importance of institutional support from the Ministry and school administration (participant 37: *"Cooperation from all educational institutions, the state and the administration"*), and on the importance of cooperation from the student (N=9, N%=3.23%) to whom the teaching intervention will be directed (participant 113: *"[...] the support of my student [...]"*). Furthermore, only 5 references (N=5, N%=1.79%) highlighted the need for appropriate technological equipment (participant 107: *"Appropriate technological equipment always makes this process easier"*), while 2 references (N=2, N%=0.72%) focused on the valuable role that differentiated pedagogical materials can have in teaching interventions, based on the principles underlying certain pedagogical tools, such as the TISIPfSENDS (participant 69: *"I will be helped by pedagogical tools such as the TISIPfSENDS and didactically differentiated pedagogical materials such as dossiers and shoeboxes. While using differentiated materials, I can also use AI applications"*).

## 6. Conclusions – Discussion

This research presented university students' views on the use of AI in language teaching interventions for students with learning difficulties. To answer the first research question (first conclusion point), the study investigated the areas and skills that students expect could be strengthened, as well as the expected benefits and potential risks. Regarding the potential [a] areas of strengthening, participants mainly expected improvements in the oral language and cognitive skills of students with SpLDs, while fewer references were made to emotional organization and psychomotor skills. The primary skills anticipated to be strengthened included written expression, spelling, numeracy, personal study organization, reading, perception, and writing. Conversely, fewer expectations were expressed for improvements in self-esteem, memory, attention concentration, and emotional organization. Specifically, the expected benefits highlighted were the general improvement of students' skills, enhancement of expression and communication, assistance in information searching, provision of personalized answers, innovation in teaching approaches, and support for teachers. The main [b] risks identified were the potential decrease in students' skills due to the provision of ready-made answers, addiction to AI applications, reduction in critical thinking, misinformation, lack of human contact, the undermining of the teacher's role, lack of personalization, provision of standardized answers, and confusion – distraction.

The concluding remarks on the second research question address the impact of influences and interactions with the educational community on students with SpLDs. Most participants considered the opinions of others, while a smaller but significant number showed indifference. Regarding expected support and resistance from the educational community, participants anticipated support from those who view AI as useful in SET according to TISIPfSEnDs, as a pedagogical tool for secondary education teachers working with students with SpLDs, with the goal of understanding texts step by step. Conversely, participants expected resistance from those who oppose AI in SET, those who are unfamiliar with it, those concerned about the use of pre-made answers, those who believe AI applications do not promote individualization according to the pedagogical perspective of TISIPfSEnDs, those who are cautious about reduced critical thinking, and those who highlight the dangers of misinformation and addiction.

The concluding opinions on the second research question address the expected support and resistance from students with SpLDs themselves. In terms of expected support, views were expressed that emphasized the ability of AI to generate interest, provide assistance, facilitate learning through ready-made responses, capitalize on pre-existing familiarity with technology, and offer personalized feedback. Conversely, resistance was anticipated from students who might struggle with using these applications and from those who would not receive personalized responses.

Finally, to address the third and last research question (third concluding point), the study explored the expected obstacles and facilitators to the use of AI applications. Specifically, the main [a] obstacles identified included a lack of knowledge about the use of the applications utilizing the pedagogical tool TISIPfSEnDs, their limited capabilities, student difficulty and indifference, lack of human communication, parental resistance, and the risk of copying answers. Fewer reports cited lack of equipment, peer resistance, lack of time, and dependence or addiction to NTs as obstacles. Among the [b] facilitators, participants noted the need for training, the importance of parental cooperation, the cooperation of the interdisciplinary team, support from the administration or state, and collaboration with the students with SpLDs themselves. Fewer references highlighted the importance of having appropriate technological equipment and differentiated pedagogical materials, such as dossiers and shoeboxes. Notably, some individuals felt there were no obstacles to the use of AI applications in teaching interventions.

In a critical review of the research findings of this research, it is worth noting that participants expressed higher expectations for enhancing students' oral language and cognitive skills, as well as their written expression and spelling skills. This aligns with the fact that among AI applications, the most popular are machine-learning language models, which can interact with users by rapidly generating text. Therefore, likely considering the most popular AI applications (i.e., language models), participants had higher expectations for enhancing skills related to written and oral expression and communication. In contrast, lower expectations were expressed for improving attention, concentration, and emotional organization skills. This is understandable, as the university students correctly identified in several responses that these applications are

aimed at the general public and most are not intended specifically for education or special education and training. Consequently, the unconditional involvement of such apps in interventions, without targeted, personalized, and didactically differentiated steps, could confuse rather than facilitate students with SpLDs. For example, students with Attention Deficit Hyperactivity Disorder (ADHD), which often coexists with dyslexia, may struggle more in digital environments with excessive and intense triggers.

Furthermore, the research's subjects expressed a high level of reservation about such applications, as evidenced by the fact that there were more references to risks than to benefits. This finding is particularly notable given that the research sample consisted of university students who, due to their young age (as indicated by the demographic questions), are more familiar with NTs, and they will be the future literature teachers in secondary education. Nevertheless, the participants expressed strong reservations about the risks of providing ready-made answers, which could weaken students' skills overall and lead to a dependent use of these answers and copying. Indeed, the risk of dependency on these behaviors cannot be overlooked when young students experiencing SpLDs are involved. For instance, students with Special Educational Needs and/or Disabilities, such as those with Autistic Spectrum Disorders who are likely to also experience SpLDs, often have difficulty managing their time and tend to develop obsessive self-stimulatory behaviors.

Moreover, the participants highlighted the risk of misinformation, a concern supported by the literature (Drossinou & Alexopoulos, 2024). Large language models, such as ChatGPT, which draw from specific databases, can provide incorrect answers when lacking appropriate information, thereby undermining the teaching intervention. Finally, the participants emphasized the importance of the teacher-student relationship, which can be threatened if AI applications are not properly implemented and their use is limited to providing standardized mechanistic answers or serving as a way to "keep the child busy" during the intervention without a targeted, didactically differentiated design, such as that advocated by the pedagogical tool TISIPfSENDS. This highlights the necessity of training literature teachers in pedagogical principles defined by targeted, didactically differentiated, and structured planning, with a focus on integrating interventions in philological courses, as advocated by the TISIPfSENDS pedagogical tool. For this purpose, the combined use of artificial intelligence applications is proposed for a specific teaching step in the intervention, involving exercises of graded reading difficulty and accompanied by differentiated pedagogical materials, such as 3D cognitive machines with files and shoeboxes made from recycled materials, available in both conventional and digital versions (Khan *et al.*, 2018; Maenner *et al.*, 2016; Marino *et al.*, 2023; Rekap, 2023).

On the other hand, the participants expect an improvement in students' skills—mainly expressive skills—and the provision of personalized help with questions and information searches. However, considering the risk of misinformation, this expectation needs to be approached critically, as these applications are not always reliable information search engines and often randomly link incorrect data to produce an answer.



Therefore, using applications like ChatGPT as search engines could be considered inappropriate.

Their views focused on potential benefits such as increased interest and engagement, innovation in learning and improved self-esteem for students with SpLDs. These benefits and risks are also supported by the literature (Baidoo-Anu & Owusu Ansah, 2023; Mastrothanasis & Kladaki, 2020; Choi *et al.*, 2023; Mastrothanasis *et al.*, 2024; Mastrothanasis *et al.*, 2018; Elbanna & Armstrong, 2023; Trust *et al.*, 2023; Ausat *et al.*, 2023).

In addition, the responses revealed conflicting views between expectations regarding the attitudes of the educational community (colleagues and parents) and those of students. More reports indicated resistance from the educational community, while there were more reports of support from the same community for students with SpLDs. In other words, students and future teachers expect resistance from parents and colleagues but support from students with SpLDs themselves. Notably, references to support from students were significantly higher than those indicating resistance. Finally, the presence of more facilitators than barriers encourages the use of such applications.

As a result, AI applications can provide valuable tools for Special Education and Training, enhancing overall teaching interventions. Early mapping of university students' perspectives was considered important for highlighting the factors that need to be taken into account to effectively support students with SpLDs. Utilization that considers the above risks and incorporates the pedagogical tools of SET, such as TISIPfSENDs, by advocating inclusive personalization, goal-centered structuring, and sectioning of instructional targets, can lead to successful interventions. Despite the strong reservations expressed, the expectations to provide assistance and improve the skills of students with SpLDs encourage the use of AI applications in SET.

## **7. Limitations and recommendations**

The research was limited to investigating the perspectives of some university students (N=120) currently studying at the Department of Philology and the Department of History, Archaeology, and Cultural Resources Management at the University of Peloponnese, by analyzing responses collected through an online questionnaire completed in parallel and during lectures in undergraduate courses between October 2023 and June 2024. Therefore, the survey could be extended to a larger sample for quantitative analyses, to university students of different departments and fields of study, or to active teachers who conduct teaching interventions for students with learning difficulties. Furthermore, it is noted that all participants were from Greece. Thus, the research can be extended to explore the perceptions of university students from other countries to draw comparative conclusions. Another limitation comes from the AI applications themselves, which are constantly being upgraded. For this reason, a review of the responses collected in this survey is needed, as respondents' views may also change accordingly.

### Acronyms

AI: Artificial Intelligence,

AIED: Artificial Intelligence in Education,

LLM: Large Language Models,

NTs: New Technologies,

SENDS: Special Educational Needs and/or Disabilities,

SET: Special Education and Training,

SpLDs: Specific Learning Disabilities,

TISIPfSENDS: Targeted, Individually Structured and Inclusion Intervention pedagogical Programs for Students with Special Educational Needs.

### Conflict of Interest Statement

The authors declare no conflict of interest.

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