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The Effect Of The Training Of Using Magic School AI On Self-Efficacy In Teaching And Information Overload Among Arabic Teachers

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Abstract:

The current research aimed to reveal the effect of using Magic School AI training on enhancing teaching self-efficacy and reducing formation overload among Arabic language teachers· An experimental methodology involved developing and accessing a twelve-session training program· The psychometric properties of the Teachers' Sense of Efficacy Scale and the perceived information overload scale in the Arabic environment were also verified· Two homogeneous groups of 30 Arabic language teachers each were selected, one experimental and the other control· The results demonstrated the effectiveness of the training program in enhancing teaching self-efficacy and reducing information overload· The current research highlights the importance of integrating AI applications into the training process, facilitating digital transformation and adaptation to rapid technological changes·

Keywords: Magic School AI; Teaching Self-Efficacy; Information Overload; Arabic Language Teachers·

Introduction

In the era of rapid technological development and digital transformation, the role of artificial intelligence (AI) applications i[1]n education and training has become prominent· These applications offer new opportunities to enhance the quality of education and increase the effectiveness of the teaching process· They provide specialized platforms to assist teachers in accomplishing numerous academic tasks, such as lesson planning, selecting learning activities, preparing various assessment tools, and suggesting personalized learning activities·

One notable application is Magic School AI, which is widely used by over 1·5 million teachers globally· It offers a wide range of tools specifically designed for them, including support in academic planning, preparation of different assessment tools, writing Individualized Education Programs (IEPs), behavioral intervention plans, and enhancing communication between teachers, families, and students (www·magicschool·ai·)·

Self-efficacy in teaching is significant for the teacher's performance· Bandura (1977) defined self-efficacy as individuals' beliefs in their capabilities to organize and execute the

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actions necessary to manage prospective situations· In the context of teaching, teachers' self-efficacy is a crucial element that influences how they plan lessons, interact with students, and assess educational experiences and their outcomes (Tschannen-Moran & Woolfolk Hoy, 2001)· This concept underscores the importance of belief in one's abilities, which can impact the effectiveness and innovation a teacher brings to their classroom, ultimately affecting student learning and engagement·

Bandura (1977) emphasized that self-efficacy influences individuals' decisions, effort level, and persistence in the face of obstacles· In the field of education, the concept of teacher self-efficacy refers to their personal beliefs in their ability to teach effectively, which is a strong indicator of their teaching performance and job satisfaction (Gibson & Dembo, 1984; Tschannen-Moran et al·, 1998)·

The dimensions of self-efficacy in teaching comprise several aspects, including teachers' self-efficacy in classroom management, which refers to the teacher's ability to effectively organize the classroom environment (Emmer & Stough, 2003); self-efficacy in instructional strategies, reflecting teachers' capacity to implement a variety of effective teaching strategies (Ross, 1992); and finally, self-efficacy in student engagement, concerning the teachers' ability to establish positive and supportive relationships with their students (Pianta, 1999)·

Self-efficacy influences teachers' performance and learning outcomes· Teachers with high self-efficacy are more inclined to face teaching challenges and overcome difficulties, leading to improved quality of education and increased academic achievement among students (Caprara et al·, 2006)· They also exhibit higher levels of innovation in teaching and flexibility in employing diverse instructional strategies (Hoy & Spero, 2005)·

Several factors influence teachers' self-efficacy, including professional training and teaching experience· Research indicates that teachers who receive intensive professional training and possess extensive teaching experience exhibit higher levels of self-efficacy (Ashton & Webb, 1986)· Additionally, administrative support and recognition from peers and the community can enhance teachers' self-efficacy (Tschannen-Moran & Barr, 2004)· These findings suggest that a supportive and appreciative environment and targeted professional development play crucial roles in fostering teachers' belief in their teaching capabilities·

Bawden and Robinson (2020) assert that information overload is a passing concern and a critical issue that pervades our era· It serves as a significant factor across a wide spectrum of fields, including science, medicine, education, politics, governance, business and marketing, planning for smart cities, accessing news, tracking personal data, home life, using social media, online shopping, and even influencing literature·

Toffler (1970) introduced the term "information overload" in his seminal work "Future Shock," wherein he delineates information overload as the challenge individuals face in understanding and making decisions regarding a particular issue due to an abundance of information· This conceptualization aligns with Bawden et al· (1999), who described information overload as the consequence of an excess of pertinent and valuable information that, paradoxically, hinders rather than facilitates decision-making processes· Furthermore, Eppler and Mengis (2004) define information overload as a state of stress experienced by individuals when the volume of information presented exceeds their maximum processing capacity· Similarly, Belabbes et al· (2023) characterized information overload as a negative psychological state wherein individuals feel inundated with excessive information, impeding their ability to perform tasks· Information overload manifests in emotional and cognitive challenges that affect the individual and their environment·

Belabbes et al· (2023) categorized the manifestations of information overload into two primary groups: emotional and cognitive· The emotional manifestations include feelings of exhaustion, stress, information anxiety, fear, and diminished confidence in one's decision-making capabilities· Moreover, when information overload obstructs contemplative activities, it may lead to more severe emotional reactions such as sadness and depression· On the cognitive side, manifestations include a diminished capacity for knowledge development and impaired concentration·

Information overload represents a form of cognitive barrier because it limits or hinders the information-seeking process and causes frustration to the individual (Savolainen et al·, 2018)· It also impacts an individual's ability to remember information and prioritize tasks (Schick et al·, 1990), leading to adverse outcomes, such as impaired decision-making processes, confusion, and a general detriment to work quality (Chewning & Harrell, 1990)· Furthermore, it contributes to information avoidance or excessive simplification and the making of inefficient decisions or their postponement due to insufficient information processing capabilities (Phillips-Wren & Adya, 2020)· Information overload adversely affects the individual's mental and physical health (Eppler & Mengis, 2004; Matthes et al·, 2020)·

Information overload is identified as a cognitive barrier because it limits or impedes the information-seeking process, leading to individual frustration (Savolainen et al·, 2018)· Additionally, it affects the individual's capacity for recalling information and prioritizing effectively (Schick et al·,1990), which can result in various adverse outcomes· These include a deterioration in the decision-making process, confusion, and a generally negative impact on work quality (Chewning & Harrell,1990)· Furthermore, it may lead to information avoidance or excessive simplification and ineffective decisions or deferment due to an inability to process information adequately(Phillips-Wren & Adya, 2020)· Information overload negatively impacts the individual's mental and physical health (Eppler & Mengis, 2004; Matthes et al·, 2020)·

The effects resulting from information overload can be classified into two categories: internal effects, which are associated with the individuals themselves, and potentially external effects, although not explicitly mentioned here, the internal effects include a decrease in creativity (Rötzel & Fehrenbacher, 2019; Virkus et al·, 2018), attentional issues (Koltay, 2017), a reduction in the level of learning and skill acquisition (Green, 2011), diminished psychological well-being (Tan & Kuo, 2019), lowered self-esteem (Furner & Zinko, 2017), and increased demands on their working memory (Lauri & Virkus, 2018; Rötzel & Fehrenbacher)· The external effects of information overload relate to the environment surrounding individuals, such as decreased productivity and task withdrawal (Swar et al·, 2017), along with diminished engagement· Furthermore, information overload can lead to material and human losses (Rötzel & Fehrenbacher, 2019)·

It is worth noting that several terms are used interchangeably with information overload, such as information fatigue syndrome, communication overload, sensory overload, information anxiety, information avoidance, and cognitive load (Alhenieidi & Smith, 2020; Bawden & Robinson, 2020)· Cognitive load results from overburdening the working memory with information (Belabbes et al·, 2023)·

The causes of information overload, a phenomenon that significantly affects individuals and society, are multifaceted· They include the surge in the volume of available information, its rapid flow, complexity, and contradictions (Swar et al·, 2017)· Furthermore, individuals often lack the necessary skills to effectively manage this information (Schmitt et al·, 2018)· Benselin and Ragsdell (2016) demonstrated that dealing with information at high speed contributes to the sensation of information overload, hindering understanding and necessary contemplative processes· Several strategies can be employed to mitigate information overload, such as teaching individuals how to efficiently sort and evaluate information and manage the timing of internet use· Information filtering

tools can also improve the quality of received information and focus attention on the most critical data (Bawden & Robinson, 2009; 2020)·

The abundance of data in our digital era has exacerbated the phenomenon of information overload· Bawden and Robinson (2020) noted that while the nature of information overload has remained unchanged since the term was coined, new causes continuously emerge· The evolution of internet usage and the diversity of associated activities have been identified as primary drivers of information overload (Alhenieidi & Smith, 2020)· This transition from an industrial-based economy to an information-based economy (MacDonald et al·, 2011), along with the emergence of social media platforms (Koroleva et al·, 2010), has significantly contributed to the issue· Social media has become a significant source of information overload, whether through the diversity of content presented (Koltay, 2017), an increase in sources, or the dissemination of irrelevant and unwanted information (Fu et al·, 2020)·

Research has focused on investigating the impact of information overload on university students· Alhenieidi and Smith (2020) demonstrated that information overload negatively affects the psychological well-being of university students, while there was no association between information overload and students' academic achievement· Similarly, Fan and Smith (2021) aimed to predict psychological well-being during the COVID-19 pandemic for a diverse sample of the Chinese community through psychological capital, information overload, and positive and negative coping strategies· The results indicated a positive association between psychological well-being and spending time acquiring information about the virus, while a negative association was observed with information overload·

The study conducted by Al-Kumaim (2021) aimed to identify the causes and effects of information overload among graduate students, utilizing a focus group methodology· The results revealed that most participants perceive information overload as a genuine and unavoidable struggle that significantly impacts their research performance at various stages of their studies· It leads to time and cost consumption, poor personal health, isolation, and decreased creativity and productivity·

The challenge of managing information overload has become increasingly important in the digital age, as it impacts individuals' performance across various sectors (Bawden & Robinson, 2020)· Despite extensive research on information overload in the workplace involving employees and companies, there needs to be more research on information overload in the academic context (Alhenieidi & Smith, 2020)·

The current research aims to examine the effect of training Arabic language teachers on the use of artificial intelligence applications in education on their self-efficacy in teaching and information overload· This research seeks to enhance our understanding of the role of technology in improving teachers' skills and enhancing their performance in classrooms· It also aims to guide efforts towards developing effective training programs aimed at promoting the effective use of artificial intelligence applications in the educational field·

The research problem is summarized in the following questions:

1· What is the effect of the training of using Magic School AI on the self-efficacy in teaching among Arabic language teachers?

2· What is the effect of the training of using Magic School AI on the information overload among Arabic language teachers?

Methodology

Research Design

We employed the experimental method to evaluate the effect of the independent variable, training on the use of artificial intelligence applications in education, on the dependent variables, namely self-efficacy in teaching and information overload· The design adopted was the two-group, experimental, and control design· The training program for teachers was announced through social media channels· The experimental group received the training, while the control group did not· The two-group experimental and control design is one of the most common designs as it enhances the validity of research findings by controlling for external factors that may influence them· This design allows for an accurate measurement of the effectiveness of the intervention by comparing the results of the two groups (Creswell, 2014)·

Population and Sample

The research population comprises all Arabic language teachers interested in training and who registered for the program, totaling 210 teachers· We selected two homogeneous groups for our experiment after applying the pre-measurement, each consisting of 30 teachers·

Table (1): Distribution of the samples

Gender	The experimental group	The control group
Males	15	15
Females	15	15

The measures

Teachers' Sense of Efficacy Scale (TSES) (Tschannen-Moran & Woolfolk Hoy, 2001)

The Teacher Efficacy Questionnaire is a widely used instrument designed to measure teachers' beliefs in their ability to teach students effectively· The questionnaire is constructed based on the theoretical framework of Bandura's social cognitive theory and consists of three dimensions:

1· Efficacy in Student Engagement: This measures teachers' beliefs in their ability to engage students in learning, including motivating students with low interest in schoolwork·

2· Efficacy in Instructional Strategies measures teachers' confidence in their ability to use instructional strategies that lead to student learning· This includes adapting instruction to meet the needs of individual students and fostering critical thinking skills·

3· Efficacy in Classroom Management: Focuses on teachers' beliefs in their ability to manage classroom behavior effectively, maintain a productive classroom environment, and handle challenges in the classroom·

The questionnaire, known as the Teachers' Sense of Efficacy Scale (TSES), consists of twenty-four statements related to these teaching areas· Respondents rate their level of agreement with each statement on a Likert scale, typically ranging from (1 = strongly disagree) to (9 =strongly agree)·

In the current research, we applied the back-translation technique (Tyupa, 2011) to translate the scale of the English version into Arabic· Initially, the scale is translated from English to Arabic by a proficient translator who is fluent in both languages and familiar with the cultural nuances of the target audience· Following this initial translation, a different translator, who has not been exposed to the original English version, translates the Arabic version back to English· Subsequently, a comparison is made between the original English scale and the back-translated English version to spot differences and assess the fidelity of the translation· Any discrepancies found are carefully reviewed and resolved through discussion among translators and subject matter experts· This iterative process continued until the back-translated version closely matched the original English version, ensuring that the translated scale was linguistically and culturally equivalent to the original·

The psychometric properties of the translated version were then verified on a sample of one hundred participants· The results of the internal consistency revealed that the Cronbach's alpha reliability coefficient for the Efficacy in Student Engagement dimension was 0·865, with corrected item-total correlation coefficients ranging between 0·389 and 0·722, indicating good correlation· For the Efficacy in Instructional Strategies dimension, the Cronbach's alpha was 0·895, with corrected item-total correlations ranging from 0·401 to 0·747· The Cronbach's alpha for the Efficacy in Classroom Management dimension was 0·912, with corrected item-total correlations between 0·452 and 0·781, indicating high internal consistency·

The Perceive Information Overload Scale (PIOS; Misra & Stokols,2012)

The scale consists of 16 self-report items utilizing a five-point Likert scale (0 = Never, 4 = Very Often) · It comprises two subscales for information overload: digital and environmental or spatial information overload· The first part contains nine items that explore the respondent's experience with digital information over the previous month, while the second part includes seven items that measure the overload of information in the environment or space during the last month·

The procedure of the Intervention

We chose The Magic School AI application for teacher training because it has many tools and is widely used by educators worldwide· We instructed a synchronous online training program consisting of synchronous online sessions for twelve training sessions, with two-hour sessions per week for Arabic language teachers·

The authors developed the training program through a comprehensive process that involved composing learning outcomes, training activities, and necessary assessment tools· A panel of five experts in Arabic language teaching and training thoroughly reviewed the program· The feedback from these experts was qualitatively analysed and utilized to refine and enhance the program·

Statistical Analysis

We utilized SPSS V·28 software to calculate descriptive statistics, verify the normality of variable distributions, calculate the corrected correlation coefficient for items, and conduct the independent samples T-test·

Results

The effect of the training of using Magic School AI on the self-efficacy in teaching among Arabic language teachers

The difference in post-test mean scores between the experimental and control groups was assessed at ($\alpha \leq 0{\cdot}05$) to evaluate the effect of the Magic School AI training program on teaching self-efficacy among Arabic language instructors· Summary statistics of the outcomes are presented in Table 2·

Table 2: Post-test summary statistics for teaching self-efficacy

Group	N	Mean	SD	df	T-test	η^2	P-Value
Experimental	30	156	2.23	58	14.98	0.89	0.001
Control	30	140	5.41				

Table 2 demonstrates that the null hypothesis can be rejected, given that the significance level is below 0·05· This result signifies that implementing the Magic School AI training program improved self-efficacy in teaching among Arabic language teachers in the

experimental group· Additionally, the effect size was calculated using eta squared (η2), which produced a value of 0·89, which is classified as a large effect size (Suter, 2011)·

The effect of the training program on using Magic School AI on the information overload among Arabic language teachers

The difference in post-test mean scores between the experimental and control groups was examined at ($\alpha \leq 0{\cdot}05$) to assess the effect of the Magic School AI training program on information overload among Arabic language instructors· Summary statistics of the outcomes are presented in Table 3·

Table 3: Post-test summary statistics for information overload

Group	N	Mean	SD	df	T-test	η^2	P-Value
Experimental	30	37	2.71	58	-9.86	0.79	0.001
Control	30	45	3.52				

Table 3 indicates that we can reject the null hypothesis as the significance level is below 0·05· This result means that the training program implemented using Magic School AI significantly reduced the information overload among Arabic language teachers in the experimental group· Furthermore, the eta squared (η2) was calculated to determine the size of the intervention's effect, resulting in a value of 0·79, which indicates a large effect size, according to Suter (2011)·

Discussion

Our study reveals the unique benefits of the Magic School AI training program in enhancing the teaching self-efficacy of Arabic language teachers· The experimental group demonstrated significantly better scores in post-intervention assessments, with a large effect size· These promising results, although not directly comparable to prior studies, can be attributed to the diverse and inclusive tools offered by Magic School, particularly its ability to provide responses in Arabic (www·magicschool·ai)·

It is essential to consider factors influencing teaching self-efficacy, such as professional training and teaching experience· Research indicated that teachers who receive intensive professional training and possess extensive teaching experience exhibit higher levels of teaching self-efficacy (Ashton & Webb, 1986)· The success of the Magic School AI training in enhancing teaching self-efficacy among Arabic teachers can also be explained through the alignment between the functionalities of the Magic School AI's tools and the dimensions of self-efficacy· The Magic School AI's tools aid teachers in classroom management, handling behavioral issues, and confronting challenging situations, thereby enhancing the teaching self-efficacy dimension of classroom management (Emmer & Stough, 2003)· Additionally, the Magic School AI offers several tools to support skills in employing teaching strategies and integrated planning for units and lessons, enhancing the teaching self-efficacy in teaching strategies (Ross, 1992)· Furthermore, the application provides a wide range of tools that generate activities and offer ideas to promote active learning and student engagement, thereby enhancing teaching self-efficacy in student interaction (Pianta, 1999)·

Moreover, the training of Magic School AI reduced the information overload among Arabic language teachers· The mean of information overload in the experimental group was significantly lower than in the control group in post-intervention assessments, with a large effect size noted· This result can be explained by the effectiveness of Magic School's tools in smoothly generating required ideas and activities, which alleviates teachers' need to search through extensive databases to find solutions for various educational scenarios and activities, meaning teachers are dealing with a reduced volume of information, thus lessening their information overload (Swar et al·, 2017)· Additionally, the availability of

tools for summarizing video segments and texts has improved the quality of processed information and focused attention on more crucial information, further reducing information overload (Bawden & Robinson, 2009; 2020)· The tools available in Magic School AI have facilitated the summarization and categorization of numerous data and tasks that would otherwise have required manual resolution by the teachers, thereby reducing the information overload, a result reflective of the abundant information and diverse activities (Alhenieidi & Smith, 2020; Bawden & Robinson, 2020)·

Conclusion

The current research revealed the effect of training on the use of Magic School AI on self-efficacy in teaching and information overload among Arabic language teachers· The results indicated that training the experimental group through synchronous online sessions for twelve training sessions, with one session per week, improved teaching self-efficacy and reduced information overload among Arabic language teachers· In light of the research findings, we recommend preparing continuous courses for all teachers on using Magic School AI and integrating artificial intelligence applications into Arabic language teacher training programs· We suggest conducting similar research on teachers of different specializations and studying the effect of training on in-class teaching skills, measured through observation· Nevertheless, One limitation of the current study is using self-reported measurement tools influenced by social desirability·

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