
MET

المجلد الثاني، العدد (الثاني) رجب 1447هـ / كانون الأول 2025

MET

2025

المجلة الدولية في الاتجاهات التربوية الحديثة

مجلة علمية محكمة ومفهرسة ومتخصصة ونصف سنوية

2 تصدرعن عمادة البحث العلمي وكلية العلوم التربوية
جامعة الزرقاء - الأردن.

Volume 2, Issue (2), Rajab 1447 / December 2025

2025

MET

The International Journal of

Modern Educational Trends (MET)

A peer-reviewed, internationally indexed, specialized, and semi-annual scientific journal

2 Issued by the Deanship of Scientific Research and the Faculty of Educational Sciences at Zarqa University

المجلة الدولية في الاتجاهات التربوية الحديثة

The International Journal of Modern Educational Trends

مجلة علمية محكمة ومفهرسة ومتخصصة ونصف سنوية

تصدرعن عمادة البحث العلمي وكلية العلوم التربوية

في جامعة الزرقاء / الأردن

المجلة الدولية في الاتجاهات التربوية الحديثة

The International Journal of Modern Educational Trends

مجلة علمية محكمة و مفهرسة عالميا و متخصصة ونصف سنوية، تصدرعن عمادة البحث العلمي وكلية العلوم التربوية في جامعة الزرقاء

A globally indexed, and peer-reviewed specailzed scientific journal issued by the Deanship of Scientific Research and Faculty of Educational Sciences at Zarqa University

هيئة التحرير (Editorial Board)

الهيئة الاستشارية (Consultative Body)

نبذة عن المجلة

مجلة علمية محكمة و مفهرسة عالمياً و متخصصة و نصف سنوية. تصدر عن عمادة البحث العلمي وكلية العلوم التربوية في جامعة الزرقاء، و تنشر بحوثها بإحدى اللغتين العربية أو الانجليزية بعد خضوعها للتقييم و التحكيم من قبل محكمين من ذوي الاختصاص وفق نظام آلي محكم.

تغطي بحوث المجلة مختلف مجالات العلوم التربوية، و تعنى بنقل و تطوير المعرفة بما يمكّن المهتمين و الباحثين في هذه المجالات من التعرف على كل جديد. و اذ تأمل المجلة أن تعم الفائدة من الأبحاث المنشورة فيها على الباحثين في هذه المجالات فإنها تنتهزها فرصة لتهيب بالمختصين في هذه المجالات لرفد هيئة تحرير المجلة بأية ملاحظات او مقترحات من شأنها أن ترتقي بمستوى ما تنشره المجلة من أبحاث. والله الموفق.

The journal is a peer-reviewed, internationally indexed, specialized publication, issued semi-annually by the Deanship of Scientific Research and the Faculty of Educational Sciences at Zarqa University. It publishes research in both Arabic and English, following a rigorous evaluation and peer-review process by experts in the field.

The journal covers a wide range of topics within educational sciences and is dedicated to advancing and disseminating knowledge, enabling researchers and interested individuals to stay informed about the latest developments in these areas.

The journal aims for its published research to benefit scholars in these fields. Additionally, it encourages specialists to provide feedback or suggestions to the editorial team to help improve the quality of the research published in the journal.

كلمة رئيس هيئة التحرير

بعونٍ من الله وتوفيقه، وباستمرار العمل الدؤوب الذي تبذله هيئة تحرير المجلة الدولية في الاتجاهات التربوية الحديثة، يسرّنا أن نقدّم للباحثين والمهتمين العدد الثاني من المجلد الثاني، في خطوة تعكس التزام المجلة بالانتظام في الصدور، وترسيخ حضورها في ميدان النشر العلمي المحكّم.

ومنذ صدور العدد السابق، شهدت المجلة تطورًا ملحوظًا على المستويين التحريري والتنظيمي؛ تمثّل في توسيع قاعدة الباحثين المشاركين، وتنوّع موضوعات الأبحاث المنشورة، وتعزيز إجراءات التحكيم العلمي بما ينسجم مع المعايير الأكاديمية المعتمدة، فضلًا عن استكمال عدد من المتطلبات الفنية والإدارية التي تسهم في رفع جودة المجلة ومصداقيتها العلمية.

وقد تأسست المجلة على رؤية واضحة تهدف إلى أن تكون منبرًا علميًا موثوقًا، وحاضنةً للبحوث والدراسات الأصيلة في مجالات العلوم التربوية والإنسانية، وهو ما حرصت هيئة التحرير على ترجمته عمليًا من خلال استقطاب نخبة من الأكاديميين ذوي الخبرة والسمعة العلمية المرموقة ضمن هيئتي التحرير والاستشارة، بما يضمن رصانة المحتوى ودقة التحكيم.

وفي المرحلة القادمة، تتطلع المجلة إلى مواصلة تطوير سياساتها التحريرية، وتعزيز حضورها الإقليمي والدولي، والعمل بوتيرة منهجية لاستيفاء متطلبات الفهرسة في قواعد البيانات العالمية، وفي مقدمتها مستوعب سكوبس العالمي (Scopus)، بما يسهم في توسيع دائرة الانتشار، وزيادة الأثر العلمي للأبحاث المنشورة.

ختامًا، نسأل الله عزّ وجلّ التوفيق والسداد في مواصلة هذه المسيرة العلمية، وأن تسهم أعداد المجلة المتعاقبة في خدمة البحث العلمي، ودعم الباحثين، والإضافة النوعية إلى حقول المعرفة التربوية والإنسانية.

رئيس هيئة التحرير

أ.د. رضا المواضية

تعليمات النشر

"المجلّة الدولية في الاتجاهات التربوية الحديثة" مجلّة علميّة محكّمة مفهرسة نصف سنوية تصدر عن عمادة كلية العلوم التربوية، وتنشر البحوث العلمية، باللغتين العربية والإنجليزية، التي تتوافر فيها شروط البحث من حيث: الأصالة، والإحاطة، والاستقصاء، وأسلوب البحث العلمي، وخطواته.

إجراءات تقديم البحث ومواصفاته:

- يقدّم البحث مطبوعاً باستخدام مايكروسوفت وورد، عبر الموقع الالكتروني للمجلة.
- يجب أن يكون البحث مكتوباً بلغة سليمة، مع العناية بما يلحق به من خصوصيات الضبط والرسم والأشكال.
- يجب أن يكون البحث غير منشور سابقاً، ولم يقدّم للنشر لجهة أخرى، وأن يرفق الباحث إقراراً خطّياً بذلك.
- يُحكَّم البحث من محكّمين اثنين، وقد يطلب من الباحث مراجعة بحثه لإجراء تعديلات عليه.
- يقدّم البحث بعد قبوله للنشر بالبريد الإلكتروني.

كيفية إعداد البحث للنشر:

يتّبع الباحث الخطوات الآتية في إعداد بحثه:

1. **البحث:**

يطبع الباحث بحثه المكون من عنوان البحث، واسم الباحث (الباحثين)، وعنوان الباحث، والملخّص، والكلمات المفتاحية، على جانب واحد من الورقة قياس (A4)، مستخدماً فراغاً مزدوجاً وحواشي واسعة (2.2 سم من الأعلى و1.5 سم من كلّ جانب).

2. **ترتيب المحتوى:**

يطلب من الباحث أن يتقيّد بالترتيب الآتي في كتابة بحثه:

طبع محتوى البحث (المقدمة، ومشكلة البحث، وطرائقه، والنتائج، والمناقشة، الملاحق، والمراجع) على جانب واحد من الورقة قياس (A4)، حيث يكون نوع الخط وحجمه على النحو الآتي:

- نوع الخط: Simplified Arabic.
- حجم الخط: 12 للعناوين الرئيسة، و11 لباقي النص.

3. **عنوان البحث:**

الحجم 23، ويجب أن يكون العنوان دقيقاً ومعبّراً عن محتوى البحث.

4. **حجم البحث:**

ألا يزيد عدد صفحات البحث على (15) صفحة من صفحات المجلة، أو (8000) كلمة.

5. الباحث وعنوانه:

يذكر اسم الباحث وعنوانه بوضوح، وينصّ العنوان على اسم الجامعة أو المؤسسة التي يعمل فيها، والقسم الذي يعمل فيه، ورتبته الأكاديمية، وبريده الإلكتروني.

6. الملخص:

يرفق بالبحث ملخص لا يزيد على (200) كلمة باللغة التي كتب بها، وآخر باللغة الثانية (العربية أو الإنجليزية) التي تعنى بها المجلة.

7. الكلمات المفتاحية:

حجم (9) يرفق بالبحث ما لا يزيد على (6) كلمات مفتاحية (دالة) خاصة به، وتكون باللغتين العربية والإنجليزية.

8. الأشكال والجداول:

ترقّم كلّ من الأشكال والجداول على التوالي حسب ورودها في البحث بحجم (8)، وتزوّد بعناوين بحجم (9)، ويشار إلى كلّ منها في متن البحث بأرقامها.

9. الهوامش:

حجم (9) تستخدم هوامش الصفحات السفلية لذكر أية ملاحظة، أو لتوضيح أية معلومة واردة في متن البحث، ويستخدم لذلك إشارة مميزة مرتفعة عن النص مثل(*).

10. المراجع:

- تستخدم الأرقام المرتفعة عن النص للتوثيق في متن البحث، ويذكر الرقم والمرجع المتعلق به في قائمة المراجع.
- ترتب أرقام المراجع في قائمة المراجع بالتسلسل، وذلك بعد مراعاة ترتيب المراجع هجائياً في القائمة حسب اسم المؤلف وفقاً للآتي:

أ- **إذا كان المرجع بحثاً في دورية:** اسم الباحث (الباحثين) بدءاً باسم العائلة، فعنوان البحث، فاسم الدورية (بخط مائل)، فرقم المجلد، فرقم العدد، فأرقام الصفحات، فسنة النشر.

ب- . **إذا كان المرجع كتاباً:** اسم المؤلف (المؤلفين) بدءاً باسم العائلة، فعنوان الكتاب (بخط مائل)، فاسم الناشر، فسنة النشر.

ج- **إذا كان المرجع رسالة ماجستير أو دكتوراة:** يكتب اسم صاحب الرسالة بدءاً باسم العائلة،" فعنوان الرسالة، "(يذكر رسالة ماجستير أو دكتوراة بخط مائل)، فاسم الجامعة، فالسنة.

د- **إذا كان المرجع نشرة أو إحصائية صادرة عن جهة رسمية:** يكتب اسم الجهة، فعنوان التقرير (بخط مائل)، فالمدينة، فأرقام الصفحات، فسنة النشر

هـ- **وقائع المؤتمر:** اسم الباحث (الباحثين) بدءاً باسم العائلة، فعنوان البحث (بخط مائل)، فاسم المؤتمر، فرقم المجلد، فأرقام الصفحات، فسنة النشر.

و- ترجمة المراجع العربية الى اللغة الانجليزية.

11. توثيق المجلات الإلكترونية ومصادر الانترنت:

أ- المجلات الالكترونية: اسم شهرة المؤلف، الاسماء الأولى (يتبع ذلك الاسم الاخير ثم الأول لمؤلفين آخرين إن وجدت). عنوان البحث. اسم المجلة مختصر يليه سنة النشر: المجلد (رقم الاصدار): عدد الصفحات. تاريخ آخر زيارة للموقع. متاح من: موقع الإنترنت.

ب- مصادر الانترنت (الشبكة العنكبوتية): اسم شهرة المؤلف، الأسماء الأولى (يتبع ذلك الاسم الأخير ثم الأول لمؤلفين آخرين إن وجدت). عنوان صفحة الويب (الإنترنت). مكان النشر: الناشر؛ تاريخ النشر[تاريخ التحديث/التعديل؛ تاريخ آخر زيارة للموقع]. متاح من: موقع الإنترنت.

ج- المستلات: يزوّد الباحث الرئيس للبحث المنشور بنسخة واحدة من العدد الذي نشر فيه بحثه، إضافة إلى خمس (5) مستلات من بحثه.

Publication Instructions

The International Journal on Modern Educational Trends is a peer-reviewed, semi-annual , and indexed scientific journal issued by the Fauculty of Educational Sciences at Zarqa University. It publishes scientific research in Arabic and English that meets the research criteria in terms of originality, comprehensiveness, investigation, and the scientific research methodology and its steps.

Research Submission Procedures and Specifications:

- The research should be submitted in print form using Microsoft Word, via journal's website.
- The research must be written in the correct language, paying attention to the specifics of punctuation, drawing, and figures.
- The research must not have been previously published, nor submitted for publication elsewhere, and the researcher must attach a written declaration to that effect.
- The research will be evaluated by two reviewers, and the researcher may be asked to revise their paper for modifications.
- The research should be submitted via email before acceptance for publication.

How to Prepare the Research for Publication:

Researchers should follow the steps below in preparing their research:

1. Research: The researcher types their research consisting of the research title, researcher's name(s), researcher's affiliation, abstract, and keywords on one side of an A4 paper, using double-spacing and wide margins (2.2 cm from the top and 1.5 cm from each side).
2. Content Arrangement: The researcher must adhere to the following order in their writing:

Type the research content (introduction, research problem, methods, results, discussion, references, and appendices) on one side of an A4 paper, where the font type and size are as follows:

   - Font type: Simplified Arabic.
   - Font size: 12 for main titles, and 11 for the rest of the text.

3. Research Title: Size 23, and the title must be precise and reflective of the research content.
4. Research Length: Should not exceed (15) pages of the journal's pages, or (8000) words.
5. Researcher and Address: The researcher's name and address should be clearly mentioned, specifying the affiliation , its department, their academic rank, and their email.
6. Abstract: An abstract no longer than (200) words in the language the research was written in, and another in the second language (Arabic or English) of interest to the journal.
7. Keywords: Size 9, the research should include no more than (6) specific (key) words.

8. Figures and Tables: Each figure and table should be numbered consecutively as they appear in the research, size 8, and provided with titles, size 9, and referred to in the text by their numbers.
9. Footnotes: Size 9, footnotes should be used for any note or clarification of information in the text, marked by a distinctive symbol like (*) elevated from the text.
10. References:

– Elevated text numbers are used for documentation in the text, and the number and related references are mentioned in the references list.
– The reference numbers in the references list are arranged sequentially after considering the alphabetical order of the references in the list according to the following:

A. If the reference is a journal article:The researcher's name (researchers') starting with the surname, "then the title of the research," then the journal name (in italics), volume number, issue number, page numbers, and year of publication.
B. If the reference is a book:The author's name (authors') starting with the surname, then the book title (in italics), then the publisher's name, year of publication.
C. If the reference is a master's thesis or a doctoral dissertation:The dissertation owner's name starting with the surname, "then the dissertation title," (Master's thesis or Doctoral dissertation in italics), then the university name, and the year.
D. If the reference is a report or statistics issued by an official body: The name of the body, followed by the report title (in italics), then the city, page numbers, year of publication
E. Conference proceedings: The researcher's name (researchers') starting with the surname, then the research title (in italics), then the conference name, volume number, page numbers, and year of publication.
F. Translation of Arabic references into English.

11. Documenting electronic journals and internet sources:

A. Electronic journals: Last name of the author, first names (followed by the last then the first name for additional authors if present). Research title. Abbreviated journal title followed by the year of publication; volume (issue number): page numbers. Date of last access. Available from: Internet site.
B. Internet sources (web pages): Last name of the author, first names (followed by the last then the first name for additional authors if present). Web page title (Internet). Place of publication: Publisher; date of publication. [date of update/revision; date of last access]. Available from: Internet site.

The International Journal of Modern Educational Trends

المجلة الدولية في الاتجاهات التربوية الحديثة

Year 2025

Volume 2

Issue 2

السنة 2025

المجلد الثاني

العدد (2)

Table of content **قائمة المحتويات**

The International Journal of Modern Educational Trends (MET)
Vol. 02, No. 02, December 2025, pp. 1~4

The Usefulness of Using Games Learning at the University Setting

Javir Diez-Palomar [1*] and Muntasir Taamneh [1]
[1] University of Barcelona, Spain

Article Info

Article history:
Received 03 November 2025
Revised 2 December 2025
Accepted 14 December 2025

Keywords:
Gamification
students
perceived usefulness

ABSTRACT

Although educational activities assist students' abilities throughout their education lives. Therefore, this study aims to fill the gap in the gamification literature and its role in enhanced students learning. In total, 115 university students from several education courses participated in this study. The data were collected using a survey technique. According to the results, perceived usefulness was moderate. As a result, the use of gamifications activities in the learning-teaching process should be encouraged as a necessary technique to assist students learning.

الكلمات المفتاحية:

التلعيب
الطلبة
المنفعة المُدرَك

ملخص

على الرغم من أن الأنشطة التعليمية تسهم في تنمية قدرات الطلبة طوال مسيرتهم التعليمية، فإن هذه الدراسة تهدف إلى سد الفجوة القائمة في أدبيات التلعيب ودوره في تعزيز تعلّم الطلبة. شارك في هذه الدراسة ما مجموعه 115 طالبًا جامعيًا من عدة مساقات تعليمية، وتم جمع البيانات باستخدام أسلوب الاستبانة. وأظهرت النتائج أن المنفعة المدركة جاءت بمستوى متوسط. وبناءً على ذلك، توصي الدراسة بضرورة تشجيع توظيف أنشطة التلعيب في عمليتي التعليم والتعلّم بوصفها تقنية أساسية تسهم في دعم تعلّم الطلبة.

**** Corresponding Author:***
Email: mtaamneh@yahoo.com (M. Taamneh)

1 Introduction

In the field of educational courses, one of the primary issues lies in the negative attitudes of students and their disengagement (Howard, 2017). Such attitudes are compounded by the ineffective education instructions revealed by researchers like (Jeong et al., 2019). At present, there are various learning techniques employed to keep at par with the dynamic changes in society and the developments in technology and science such as gamification (Sojayapan & Khlaisang, 2018; Julieth, Martha, & Mileidy, 2020). In several research types, gamification is a term that has been referred to as the use of game elements to understand non-gaming objects (Jdaitawi, 2022; Nadlifatin, 2020). The learning type is built on the gamification value and its positive influence over the students' learning experience as evidenced in study (Mohamed, 2020). Wichadee and Pattanapichet (2018) supported the influence of gamification on the positive spirit of students, their motivation and their learning results, and (Papp, 2017) revealed that gamification influences the motivation of students, their engagement in the learning environment for both students and teachers. Literature (Adachi & Willoughby, 2013; Andrade, 2020) also supported that video games activities improve a number of skills among individuals such as, problem-solving, leading to better academic grades, leadership, attitude, communication, teamwork, collaboration, creative thinking and motivation.

2 Literature Review

More importantly, the main advantages highlighted in gamification studies are easy access, flexibility, developing critical thinking, and positive outcomes relating to motivation, participation, collaboration and engagement (Vanduhe, V, Nat, M, Hasan, 2020), and all these lead to improved training and learning as evidenced in Stiegler and Zimmerman (2015). According to (Liu, D, Santhanam, R, Webster, 2017), gamification elements lead to enhanced and positive outcomes, facilitate enjoyable experience from monotonous activities and heighten students' engagement in assignments and learning. Other studies in this line supported the significance of gamification education and its role in motivating students and enhancing their engagement (Figueroa-Flores,2015). However, in some studies of this caliber, negative results were reported concerning the gamification potential in students' learning environment (Andrade, 2020; Landers, Armstrong, 2017; Thornton, Francia, 2014; Al-Rahily, 2018); for instance, (Mese & Dursun, 2020) reported no gamification effects on the instructional outcomes, in a case where there is low attitude was harbored regarding game-based learning. While some others like (Al-Nashiri, 2022) supported optimum performance of students and supporting the positive contribution of gamification towards English language skills development. In sum, performance is an important aspect of motivation and commitment in education (Creswell, 2012), which helps to foster a lifelong participation and social interaction. Research in literature has studied the connection of gamification in educational courses with various variables, but gaps still exist that need to be minimized. However, the study presented in this article focuses on the learning performance of students.

3 Methodology

A quantitative research design was used in this study as recommended by prior studies (Fared, Jdaitawi, Sheta, 2018). As mentioned, the survey is the data collection instrument, of which copies were distributed to university students.

3.1 Participants

There were 115 participants studying in universities located in the Western region of Jordan, from which cross-sectional data was gathered. The sample units were considered based on their use of gamification in their learning process, and they were requested to provide their feedback through self-report in order to identify the influence of gamification usage on their day-to-day learning. Before collecting data, the author obtained verbal permission from the participants for their voluntary participation in the study. The author informed them about the scientific and confidential use of their provide data. From the 115 participants, (52.8%) were male students, while the remaining (47.2%) were female students.

3.2 Measurement

The study's measurements of constructs were adopted from prior related studies, with the items gauged using a 5-point Likert scale. Specifically, perceived usefulness 4 measuring items were adopted from (Ashfaq, M, Yun, J, Yu, S, Loureiro, 2020), with alpha value of 0.80.

Table 1: Cronbach's alpha

Variable	**Cronbach's Alpha**
Perceived Usefulness	0.80

4 Results

The gathered data was analyzed using SPSS, the study found that the most of the students 81% use games activities frequently, 19% of them were not. The results however indicated games activities were useful as sown in table 2.

Table 2. *Frequency Results.*

Variable	No.	%
Agree	94	81
Not	2	19

5 Discussion:

The proposed model was developed by integrating perceived usefulness of education courses among students. Data was gathered from the students from the Jordanian universities, and the results supported good level of perceived usefulness. In other words, the students perceived gamification technology to be useful in their learning. The usefulness of gamification increases their perception of its importance in achieving learning outcomes and completing assignments. Individuals must possess good technological skills and be familiar with technological tasks, in order to enjoy good health and have the ability to perform educational duties perfectly. Therefore, users perceiving that IT is beneficial to their tasks will have a positive perception of it and be encouraged towards its adoption.

6 Conclusion

This study examined the level of technology perceived usefulness among university students'. Technology adoption studies, particularly focused on gamification have been scarce and as such, this study's findings provide significant support to the proposed study model. There are multiple contributions of this research to the theory concerning gamification, the first of which is the study contributes to the development of gamification applications in light of theory and conceptual framework to investigate its influence over the student's learning. The implications of the results are thus significant for decision-makers, academicians and managers of the higher education institutions who can leverage the proposed models and frameworks to enhance technological adoption in the learning environment.

6.1 Limitations and Suggestions

One of the study's limitations pertains its study sample which comprises of universities students, limiting the generalization of findings to the whole population, therefore, next studies may implement the study design by increasing the study sample through including other universities. Lastly, the study's examined factors are limited and thus, future studies should include additional factors, like personal factors and technology factors to the model to test the direct/indirect relationship to validate the proposed model.

References

Ali, O., Murray, P., Momin, M., Dwivedi, Y., & Malik, T. (2024). The effects of artificial intelligence applications in educational settings: Challenges and strategies. Technological Forecasting and Social Change, 199, 123076. https://doi.org/10.1016/j.techfore.2023.123076

Choi, S., Jang, Y., & Kim, H. (2023). Influence of Pedagogical Beliefs and Perceived Trust on Teachers' Acceptance of Educational Artificial Intelligence Tools. Int. J. Hum. Comput. Interact, 39, 910–922.

Han, M., Mustafa, H., & Kharuddin, S. (2025). AI adoption in accounting education: A UTAUT-based analysis of mediating and moderating mechanisms. Journal of Pedagogical Research. Advance online publication. https://doi.org/10.33902/JPR.202532831

Raffaghelli, J., Rodriguez, E., Guerrero-Roldan, A., & Baneres, D. (2022). Applying the UTAUT model to explain the students acceptance of an early warning system in higher education. Computer & Education, 182, 104468. https://doi.org/10.1016/j.compedu.2022.104468

Venkatesh, V., Thong, J., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology, MIS Quarterly, 36, 157–178, 2012. https://doi.org/10.2307/41410412

The International Journal of Modern Educational Trends (MET)
Vol. 02, No. 02, December 2025, pp. 5~14

Embedding Sustainability into Young Child Experiences: The Evidence from Empirical Study of Green Kindergartens

Mohd Sofian Omar Fauzee [1]*, Kholoud Imhammad Meqbil Al-Mseidin[2], Mohd Faiz Mohd Yaakob[3], Mohammad Al-Zubi[4]

[1] INTI International University, Malaysia
[2] Ministry of Education, Amman, Jordan
[3] Universiti Utara Malaysia, Malaysia
[4] Department of Early Childhood, Zarqa University, Zarqa, Jordan

Article Info

Article history:
Received 1 April 2025
Revised 30 April 2025
Accepted 16 May 2025

Keywords:
Green kindergartens
Early childhood education
Sustainability
Systematic review
PRISMA

ABSTRACT

Green kindergartens are positioned as a growing phenomenon in early childhood education (ECE) arising within a worldwide context concerning sustainability, environmentalism and holistic child development. These are realized through, for example, sustainable architecture, nature-oriented learning environments and education for sustainable development, and are seen as an avenue for providing environmental education to develop children holistically. Despite the rapid spread of green kindergarten programmes across schools, evidence for the effectiveness of green kindergartens remains thin. This systematic review examines in particular empirical studies on green kindergartens and early childhood education environments with an emphasis on sustainability. Following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework, we searched across major databases including Scopus, Web of Science, ERIC, and ScienceDirect. Twenty-five peer-reviewed empirical studies published between 2005 and 2024 met the inclusion criteria and were analysed using theme synthesis. Preliminary findings indicate a correlation between green kindergartens and children's cognitive capacity, socialisation, emotion regulation, exercise, and environmental awareness. Additionally, educational systems focused on sustainability - outdoor education, experiential education activities, project-based environmental education - were acknowledged as central to green kindergarten systems. We highlight pressing questions about teacher preparedness, resource allocation, policy coherence. This review argues that green kindergarten systems provide promise for improving sustainable ECE - and calls for substantial, detailed and multi-year rounds of research to support this proposition.

الكلمات المفتاحية:

رياض الأطفال الخضراء
تعليم الطفولة المبكرة
الاستدامة
المراجعة المنهجية
برايزما

ملخص

تُعَدّ رياض الأطفال الخضراء ظاهرة متنامية في مجال تعليم الطفولة المبكرة، نشأت في سياق عالمي متزايد الاهتمام بالاستدامة، وحماية البيئة، وتنمية الطفل تنمية شمولية. ويتجسّد هذا التوجّه من خلال، على سبيل المثال، العمارة المستدامة، وبيئات التعلم المرتكزة على الطبيعة، والتعليم من أجل التنمية المستدامة، حيث يُنظر إلى رياض الأطفال الخضراء بوصفها مدخلًا فاعلًا لتقديم التربية البيئية بما يسهم في تنمية الطفل بصورة متكاملة.وعلى الرغم من الانتشار السريع لبرامج رياض الأطفال الخضراء في المدارس، فإن الأدلة العلمية الداعمة لفاعلية هذه البرامج لا تزال محدودة. تهدف هذه المراجعة المنهجية إلى فحص الدراسات التجريبية التي تناولت رياض الأطفال الخضراء وبيئات تعليم الطفولة المبكرة، مع التركيز على البعد الاستدامي. وباتباع إطار) PRISMA العناصر المفضلة لإعداد المراجعات المنهجية والتحليلات البعدية)، تم إجراء بحث شامل في قواعد بيانات رئيسة شملتScopus :، وWeb of Science، وERIC، و.ScienceDirectوقد استوفت خمس وعشرون دراسة تجريبية محكّمة، نُشرت خلال الفترة الممتدة من عام 2005 إلى عام 2024، معايير الاشتمال، وتم تحليلها باستخدام

منهجية التحليل الموضوعي. وتشير النتائج الأولية إلى وجود ارتباط بين رياض الأطفال الخضراء وكلٍّ من القدرات المعرفية للأطفال، والتنشئة الاجتماعية، وتنظيم الانفعالات، والنشاط البدني، والوعي البيئي إضافة إلى ذلك، جرى الاعتراف بأن النظم التعليمية المتمحورة حول الاستدامة—مثل التعليم في الهواء الطلق، والأنشطة التعليمية القائمة على الخبرة، والتعليم البيئي القائم على المشروعات—تُعد عناصر محورية في منظومة رياض الأطفال الخضراء. كما تسلّط هذه المراجعة الضوء على تساؤلات ملحّة تتعلق بجاهزية المعلمين، وتخصيص الموارد، واتساق السياسات التعليمية. وتخلص الدراسة إلى أن نظم رياض الأطفال الخضراء تنطوي على إمكانات واعدة لتعزيز تعليم الطفولة المبكرة المستدام، مع التأكيد على الحاجة إلى جولات بحثية موسّعة، ومتعمقة، وطويلة الأمد لدعم هذا التوجه علميًا.

**** Corresponding Author:***
Email: me4youjl@hotmail.com (Kholoud I. M. Al-Mseidin)

1 Introduction

Sustainability has nowadays become a top phenomenon in both public and academic discourse and policy making that is thought to be imperative to counter the mounting environmental problems, climate changes, and general need to raise conscious humans (Al-Zu'bi et al., 2024). In this frame work the pre-school level of children, ECE (Early childhood education) has grown into a focal point where sustainability concepts, attitudes and skills need to be developed in them (Al-Zu'bi et al, 2024). Early infancy is a significant period of learning in which children become aware of the natural world, the obligations to the community and their interaction (Wilkie, 2018).

The rise of green kindergartens is a notable response to the worldwide trend towards sustainability. These establishments are designed with sustainable architecture, embrace landscaping and outdoor learning, offer energy-efficient buildings, and educational practice that fosters environmental awareness and experience. It is also said look beyond green issues, as a means to promote cognitive, social, emotional and physical development of children.

Despite the increasing emergence worldwide, in Europe, North America, Asia and Australia, there is limited body of empirical studies measuring the pedagogical effectiveness of green kindergarten and exist on a philosophical plane. There is variation in the model, adoption and evaluation of green kindergarten. Some measures emphasis of green kindergarten is on architecture and environment, while other focus on teaching techniques, learning outcomes or child development. Lack of definitional clarity limit the ability to synthesize facts and reach solid conclusions (Al-Zu'bi et al., 2024).

While many of the research confirm the positive child developmental and educational outcomes of green kindergarten environments, other studies mention the toll is quite big in terms of costs of implementation, insufficient pre practices provide support for teachers, restricted support from institutions and inconsistency of related policies. The studyclose review of empirical studies in order to gather knowledge of preschool contexts, significant findings and challenges in the light of future research and policy formulation in sustainable advances.

2 Theoretical and Empirical Literature Review

2.1 The Rationale of Green Kindergartens

The underpinnings of green kindergartens are entwined, closely linked to Education for Sustainable Development (ESD), socio-constructivist learning theory, and ecological systems theory. These perspectives together offer a framework for understanding the implications for young children's learning of green-oriented environments.

Education for Sustainable Development examines the application to education of the environmental, social, and economic aspects of sustainability. In early childhood settings, ESD emphasizes how to provoke in children their curiosity, their caring for nature, and a sense of responsibility through developmentally appropriate and experiential learning activities. Commentators argue that sustainability education in early childhood should consider both the tangible experience and the concrete (rather than an abstract concept), allowing children to interact intimately with natural systems (Davis, 2015).

From the perspective of socio-constructivism, learning occurs when children create knowledge from their interactions with their experiences and peers. Green kindergarten settings, especially those with significant outdoor/nature-based learning spaces, create vast opportunities for discovery, collaboration and problem-solving. The settings therefore resonate with the ideas touted from constructivism that children learn most in play and inquiry- or experience-based direct engagement with environments (Elliott & Davis, 2009).

Ecological systems theory bolsters the rationale for green kindergartens by asserting that children are all intertwined with their natural, social and cultural environments. It holds that all learning environments are not neutral but have an active role in children's developmental experiences. Green kindergarten settings may be understood as ecological systems that influence the child's inclination, engagement, behaviour, and attitudes to a more ecologically sensitive vision.

The empirical studies on green kindergartens touch upon an impressive range of outcomes. Studies show again and again signatures of natural and green learning environments visitation patterns in children in terms of more cognitive engagement, greater attention, and higher motivation to learn (Kuo et al., 2019).

Research on social emotional learning show greater degrees of sharing, cooperative empathy, emotional regulation that presumably arises from the sharing nature of many outdoor educational activities. Physical development is a significant objective of large sections of the literature. As natural play spaces promote play (and playable terrains), mobility and risk taking that carries with it the imperative to develop large muscle skills, physical well-being, environmental knowledge and proecological behaviours including recycling and conservation habits. These are oft-reported outcomes of sustainability-focused programs of early environmental experience.

Notwithstanding the favourable observations, however, this reviewer warns of serious weaknesses in the literature ranging from such small sample sizes or transient "treatment" length, qualitative nature of research methods that makes finding replicable or statistically meaningful results difficult. There is scant amount of longitudinal research to discover the degrees of attitudes

and behaviours to environmental concerns that affect children's experiences in their later developmental years using green kindergarten experiences.

3 Methodology

Data Gathering and Analysis - A systematic review method that follows the PRISMA framework. The review must come as a result of clear guidelines for finding, screening and assembling research evidence.

3.1 Plan for Searching

An extensive literature search was conducted in Scopus, Web of Science, ERIC, ScienceDirect and Google Scholar. The search strings included some of the following terms "green kindergarten," "sustainable early childhood education," "nature-based learning," "environmental education in kindergarten."

3.2 Including and Not Including Conditions

Too be included studies had to: 1. be reviews by these experts in empirical study, 2. focus on setting of kindergarten or early childhood settings for kids aged 3 to 6 years old, 3. clearly discuss green sustainable nature learning settings, 4. be published in English from the years 2005-2024. Concept papers, policy reports and studies that only looked at elementary or secondary education were not included.

3.3 The PRISMA Process

There were 4 steps to the PRISMA process: discovery, screening, eligibility and inclusion. A first group of 1,132 items were found. After removing duplicates and checking the titles and abs, 67 pieces were read to determine eligibility. Then, 25 studies passed all criteria for inclusion and were included in the final synthesis. Data Analysis: The studies were analysed using thematic synthesis. Key information was extracted relating to the study's design, setting, participant details, what "green kindergartens" is, findings, and reported issues.

4 Results

The analysis of the 25 included studies revealed five dominant thematic categories.

Table 1. *mmary of Empirical Studies Included in the Systematic Review (n = 25).*

No.	Study Title	Authors	Year	Key Findings
1	Education for Sustainability in Early Childhood	Davis, J.	2015	ECE sustainability enhances environmental awareness and holistic development
2	Sustainability and Early Childhood Education	Elliott, S.	2014	Green ECE environments support experiential and inquiry-based learning
3	Exploring the Resistance to ESD in ECE	Elliott & Davis	2009	Identified pedagogical and institutional barriers to green ECE
4	Education for Sustainable Development in ECE	Siraj-Blatchford et al.	2010	Green kindergartens foster early pro-environmental behaviors
5	Benefits of Nature Contact for Children	Chawla, L.	2015	Nature exposure improves emotional well-being and social skills

6	Nature and Young Children	Wilson, R.	2018	Nature-based learning enhances curiosity and creativity
7	Green Schoolyards and Learning	Kuo et al.	2019	Green environments improve attention and academic engagement
8	Using Behavior Mapping in ECE	Moore & Cosco	2010	Outdoor green spaces promote physical activity
9	ESD in Preschool Contexts	Ärlemalm-Hagsér	2013	Sustainability concepts can be embedded in preschool curricula
10	Children's Learning in Outdoor Environments	Maynard & Waters	2007	Outdoor learning supports cognitive and social development
11	Forest School and Child Development	O'Brien & Murray	2007	Nature-based programs improve confidence and resilience
12	Sustainable Preschool Practices	Pramling Samuelsson	2011	Early sustainability education shapes long-term attitudes
13	Green Architecture in ECE	Woolner et al.	2010	Green design positively affects learning behavior
14	Nature-Based ECE Programs	Gill, T.	2014	Outdoor play enhances physical and emotional health
15	Environmental Learning in Kindergarten	Palmer	1995	Early exposure builds environmental responsibility
16	Early Childhood and Sustainability	Davis & Elliott	2014	Integrating ESD requires systemic support
17	Play and Learning Outdoors	Fjørtoft	2004	Natural play improves motor development
18	Children's Experiences in Green Schools	Malone & Tranter	2003	Green spaces increase engagement and well-being
19	Sustainability Pedagogy in ECE	Hedefalk et al.	2015	Teachers play a central role in sustainability learning
20	Learning Through Landscapes	Titman	1994	Green spaces support holistic learning
21	Environmental Education for Young Children	Davis	2009	Sustainability concepts can be age-appropriate
22	Green Schools and Child Outcomes	Cole	2013	Sustainable schools improve comfort and learning
23	Nature, Play and Learning	Lester & Maudsley	2007	Play in nature supports emotional resilience
24	Sustainability in Nordic Preschools	Johansson	2016	Policy support enhances green ECE implementation
25	Green Learning Environments Review	Rickinson et al.	2004	Outdoor learning improves motivation and attitudes

Table 2 overview of studies included in the systematic review highlighting the prevalence of research on green kindergarten and sustainability-oriented early childhood education, with the collective research spanning over three decades from the mid 1990s to 2024. The historical analysis suggests that earlier studies primarily focused on environmental awareness and outdoor environment,

while more recent studies adopted holistic sustainability frameworks encompassing cognitive and social emotional and physical aspects of child development.

Table 2. reveals a high agreement in the positive impact green kindergarten environments have on child development overall. Studies tend to indicate increased cognitive engagement, attention, creativity, and problem solving skill especially within pedagogies that align with nature-based and constructivist approaches... green learning environments offer rich sensory exploratory experiences promoting inquiry-based learning and active knowledge building in early childhood.

Beyond cognitive learning, social and emotional development emerged as prominent theme across studies...Outdoor and group activities described previously were common methods to promote belonging and resilience. Various research shows that natural areas can calm and restore the nervous system, leading to lower stress and better selfregulation (Al-Mseidin, et al., 2023).

Consistently across the research highlighted in Table 2, were themes related to physical development and healthrelated outcomes. Children in green kindergartens were found to be more physically active, be more mobile, and live healthier lives than children in traditional classrooms. Access to nature play and opportunities for active exploration were contributing factors.

Likewise, a variety of studies reported significant gains in awareness of environment and proenvironmental behaviours (Table 2). Involvement in sustainability initiatives (gardening, recycling, conservation) was shown to contribute to the development of nascent environmental attitudes, indicating the role of green kindergartens as a setting for Education for Sustainability during childcare practices.

However, in conjunction with overwhelmingly positive developments, Table 2 indicates several steep hurdles to the successful rollout of green kindergarten models. Various researchers have noted difficulty in teacher/pedagogist readiness, nil access to pertinent PD on sustainabilityeducation, and limited available resources. The lack of a strong definition and implementation of green kindergarten made it impossible to compare results across studies and policies and attempt implementation of findings.

Reading down Table 2 one can glean that green kindergartens produce many positive developmental and educational outcomes but also can offer a few serious drawbacks to research, policy and practitioner preparation. This data collects a large body of work to inform the thematic analysis in the last sections of the results, and the overall theme of sustainability in childcare will also be referenced throughout.

4.1 Conceptual Definitions and Models

Green kindergartens were referred to as settings that combined sustainable structures, natural play and learning spaces, and pedagogy on environmental issues. Conceptual parameters varied substantially across studies based on contextual and cultural aspects.

4.2 Cognitive and Learning Outcomes

Most studies found increases in attention, problem-solving, creativity, and engagement. Nature-based activities were found to be conducive to inquiry-based learning and criticial-thinking skills.

4.3 Social and Emotional Development

The students in green kindergartens were found to cooperate more, had higher levels of empathy and wellbeing. “Extra-curricular and joint ventures nurtured social interaction and ameliorated tension”.

4.4 Physical Development and Health

Adoption of healthy lifestyle behaviours were routinely found. Nature was found to encourage vigorous play and exploration.

4.5 Environmental Awareness and Behavior

the main challenges faced were lack of teacher training, funding, weak policy support, and "absence of assessment tools to evaluate sustainability outcomes".

4.6 Implementation Challenges

The lack of teacher training, funding, weak policy support, and absence of assessment tools to evaluate sustainability outcomes.

5 Discussion

The aim of this systematic review was to review and collate empirical research concerned with green kindergartens and sustainable early years education. The principal findings suggest a strong and positive relationship between green kindergarten settings and good developmental, educational and environmental outcomes for children. However, further caution is needed before applying the findings beyond the studies reviewed in terms of theory, methodology and context (Alahmari, et al., 2023).

That said, a general conclusion in this area is that children who engaged with green kindergarten settings increase in attention concentration and general cognitive involvement in educational tasks. This third finding, reported in many samples, reflects constructivist and experiential learning theories: that children learn through engagement with nature, and the effortful engagement of manipulating spaces "with few limitations" rather than learning in confined spaces such as classrooms. Green and black settings or environments, provide various types of stimuli and 'encounters' for children in day to day learning, as well as opportunities for being in walking, and navigating nature (Muhaidat, et al., 2022).

Another area where attention to the Green Kindergarten approach is much needed, is social and emotional development. Multiple studies across countries revealed increases in cooperation, empathy, emotional regulation and general wellbeing. Some (Marni, et al., 2024) have discussed these outcomes in the context of eco-social emotional learning theory.The restorative and healing properties of nature, often acknowledged in the existing literature, may also explain the decreases in stress and behavioral difficulties in green kindergartens. Physical development was a further important outcome associated with green kindergarten environments. Increased activity levels, coordination of finer motor functions, and more healthful patterns of movement were found across studies on outdoor and nature play experiences, substantiating our hypothesis that verdant learning environments promote much exciting locomotion, adventure, and calculated risk-taking, hallmark features of physical development for the infant mind.

Environmental awareness and pro-environmental behaviour represent important aspects of green kindergarten goals, and lie at the heart of the Education for Sustainable Development (ESD) paradigm. The studies analysed here seem to suggest that children in sustainability-related initiatives gain a nascent understanding of caring for the environment, conserving resources, and awareness of nature. Though these behaviours are essentially age appropriate and quasi-symbolic, their manifestation lends credence to the argument that sustainability education can indeed start young. Conversely, the evaluation does show that most research focuses largely on the emphasis on the environmental aspects of sustainability, with less attention paid for social equity and economics.This gap reflects a narrower and less developed understanding of sustainability as it relates to children's experiences of green kindergartens (Alzahrani, et al., 2023).

Even while the majority of the results are quite positive, we must note some gaps that limit the interpretation and wider relevance of the literature. In particular, the definition and application of the green kindergarten model itself are not examined consistently across studies. Some investigations focus on the built environment whilst others highlight outdoor learning experiences or pedagogical content. Without consistency in this regard, the studies cannot be compared and may require more explicit programmatic foundations.

Limitations of methodology arise here as well - many studies reviewed used small qualitative samples and/or very brief observations. These still provide much insight into children's experiences and contexts, but there is limited causal inference to be had and little investigation of long-term effects. Related, the review finds that longitudinal and experimental studies are sorely lacking, both of which could be powerful given children's development in kindergartens and topics of sustainability (Alqarni, et al., 2024).

The knowledge and availability of reliable teachers and resources at a school were persistent themes that affected the success of green kindergarten programs. Together these findings suggest that green kindergartens cannot be conceptualized simply as environmental or place-based remediations, but rather must be treated as complex educational systems that require support at multiple levels.

We conclude by restating that the results of the review, as evidenced by the above discussion, indicate that green kindergartens have great potential to promote full child development and sustainable literacy, but also face significant conceptual, methodological, and practical challenges in need of study to better understand the evidentiary basis. We interpret the findings in terms of existing conceptions in the literature, but also recognize what appears to be the 'ground cloudy' (Guang, 2020) aspect of the findings and point to some conclusions that suggest future research and pedagogical directions.

6 Conclusions and Recommendations

This systematic review indicates that green kindergartens are a novel approach to teaching sustainability in early childhood, with positive effects on cognitive, social, emotional, physical and environmental outcomes. But the effectiveness of these programs depends heavily on contextual issues, teachers preparedness and institutional support. In terms of where we go next, there are a major recommendations developing teacher training programs in sustainability education, establishing appropriate policy promoting green kindergarten initiatives, and conducting longitudinal impact studies and cross cultural comparisons on long term impact while other researchers continue their focus research on the social and economic sides to sustainability.

References

Alahmari, M., Jdaitawi, M., Alzahrani, M., Kholif, M., Ghanem, R., & Nasr, N. (2023). Promoting Self-efficacy for Students with Special Needs through Augmented Reality. International Journal of Information and Education Technology, 13(7), 1021-1026.

Al-Mseidin, K. I., Al-Zu'bi, M. A., Al-Mawadieh, R. S. M., & Alelaimat, A. M. (2023). The integration of AI applications in psychological and educational counselling for university students: Opportunities and challenges. In Proceedings of the 24th International Arab Conference on Information Technology (ACIT) (pp. 1–6).

Alqarni, T. M., Hamadneh, B. M., & Jdaitawi, M. T. (2024). Perceived usefulness of Internet of Things (IOT) in the quality of life of special needs and elderly individuals in Saudi Arabia. Heliyon, 10(3).

Alzahrani, M., Alrashed, Y., Jdaitawi, M., Abdulghani, S., Nasr, N., Ghanem, R., & Kholif, M. (2023). Determinants affecting student engagement in online learning: Examining teaching styles and students' computer self-efficacy. Asian Journal of University Education (AJUE), 19(3), 573-581.

Al-Zu'bi, M. A. A., Al-Mseidin, K. I. M., Yaakob, M. F. M., & Fauzee, M. S. O. (2024). The impact of the school educational environment on primary school teachers' commitment to educational quality. Discover Sustainability, 5(1), Article 449. https://doi.org/10.1007/s43621-024-00449-x

Ärlemalm-Hagsér, E. (2013). Respect for nature – A challenge in preschool education. International Journal of Early Childhood, 45(1), 75–89. https://doi.org/10.1007/s13158-012-0076-3

Ärlemalm-Hagsér, E., & Pramling Samuelsson, I. (2018). Education for sustainability in early childhood education: A global perspective. Sustainability, 10(3), 975. https://doi.org/10.3390/su10030975

Chawla, L. (2015). Benefits of nature contact for children. Journal of Planning Literature, 30(4), 433–452. https://doi.org/10.1177/0885412215595441

Cole, L. B. (2013). Greening the campus: A whole-systems approach. Island Press.

Davis, J. (2009). Revealing the research 'hole' of early childhood education for sustainability. Environmental Education Research, 15(2), 227–241. https://doi.org/10.1080/13504620802710607

Davis, J. (2015). Young children and the environment: Early education for sustainability (2nd ed.). Cambridge University Press.

Davis, J., & Elliott, S. (2014). Research in early childhood education for sustainability: International perspectives and provocations. Routledge.

Elliott, S. (2014). Sustainability and early childhood education: Research perspectives. Australian Journal of Environmental Education, 30(2), 177–193. https://doi.org/10.1017/aee.2015.1

Elliott, S., & Davis, J. (2009). Exploring the resistance: An Australian perspective on educating for sustainability in early childhood. International Journal of Early Childhood, 41(2), 65–77. https://doi.org/10.1007/BF03168879

Fjørtoft, I. (2004). Landscape as playscape: The effects of natural environments on children's play and motor development. Children, Youth and Environments, 14(2), 21–44.

Gill, T. (2014). The benefits of children's engagement with nature: A systematic literature review. Children, Youth and Environments Trust.

Hedefalk, M., Almqvist, J., & Östman, L. (2015). Education for sustainable development in early childhood education: A review of the research literature. Environmental Education Research, 21(7), 975–990. https://doi.org/10.1080/13504622.2014.971716

Johansson, E. (2016). Values and sustainability in early childhood education. International Journal of Early Childhood, 48(2), 117–132. https://doi.org/10.1007/s13158-016-0162-0

Kuo, M., Barnes, M., & Jordan, C. (2019). Do experiences with nature promote learning? Frontiers in Psychology, 10, 305. https://doi.org/10.3389/fpsyg.2019.00305

Lester, S., & Maudsley, M. (2007). Play, naturally: A review of children's natural play. National Children's Bureau.

Malone, K., & Tranter, P. (2003). Children's environmental learning and the use, design and management of schoolgrounds. Children, Youth and Environments, 13(2), 87–137.

Marni, M., Abdullah, K. H., Yaakob, M. F. M., Fauzee, M. S. O., Jamil, S. F., & Al-Zu'bi, M. A. A. (2024). Why teacher job satisfaction matters: Strengthening head teachers' transformational leadership in sustainable development education. Fronteira: Journal of Social, Technological and Environmental Science, 13(3), xx–xx.

Maynard, T., & Waters, J. (2007). Learning in the outdoor environment: A missed opportunity? Early Years, 27(3), 255–265. https://doi.org/10.1080/09575140701594400

Moore, R. C., & Cosco, N. G. (2010). Using behavior mapping to investigate healthy outdoor environments for children. Children, Youth and Environments, 20(1), 33–55.

Muhaidat, F., Alashkar, W., Jdaitawi, M., Abu-Joudeh, M., Hussein, E., Rabab'h, B., ... & Talafha, F. (2022). A meta analysis on augmented reality application for individuals with intellectual disability. International Journal of Information and Education Technology, 12(9), 970-976.

O'Brien, L., & Murray, R. (2007). Forest School and its impacts on young children: Case studies in Britain. Urban Forestry & Urban Greening, 6(4), 249–265. https://doi.org/10.1016/j.ufug.2007.03.006

Palmer, J. A. (1995). Environmental thinking in the early years: Understanding and misunderstanding of concepts related to waste management. Environmental Education Research, 1(1), 35–45. https://doi.org/10.1080/1350462950010104

Pramling Samuelsson, I. (2011). Why we should begin early with ESD: The role of early childhood education. International Journal of Early Childhood, 43(2), 103–118. https://doi.org/10.1007/s13158-011-0034-x

Rickinson, M., Dillon, J., Teamey, K., Morris, M., Choi, M. Y., Sanders, D., & Benefield, P. (2004). A review of research on outdoor learning. National Foundation for Educational Research.

Siraj-Blatchford, J., Smith, K. C., & Pramling Samuelsson, I. (2010). Education for sustainable development in early childhood: World Organization for Early Childhood Education (OMEP). UNESCO.

Titman, W. (1994). Special places; special people: The hidden curriculum of school grounds. World Wide Fund for Nature.

Wilson, R. (2018). Nature and young children: Encouraging creative play and learning in natural environments (3rd ed.). Routledge.

Woolner, P., Hall, E., Higgins, S., McCaughey, C., & Wall, K. (2010). A sound foundation? What we know about the impact of environments on learning and the implications for building schools for the future. Oxford Review of Education, 36(3), 347–370. https://doi.org/10.1080/03054981003775239

The International Journal of Modern Educational Trends (MET)
Vol. 02, No. 02, December 2025, pp. 15-17

Students Intention Behavior to use Artificial Intelligence Technology among university students

Sami Al-Muberik [1*]
[1] Imam Abdulrahman bin Faisal University, Saudi Arabia

Article Info

Article history:
Received 1 October 2025
Revised 30 November2025
Accepted 17 December 2025

Keywords:
Artificial Intelligence
English
Readiness
learning

ABSTRACT

A critical issue in the field of English language is the lack of autonomy in AI English learning applications, which leads to lower student success. This study investigates the students Intention Behavior to use Artificial Intelligence Technology, with a sample consisting of 110 university students. Based on the obtained results, a positive intention towards using AI technologies. The study has recommended that the university should focus on the enhancement of AI practices in students' learning processes.

الكلمات المفتاحية:
الذكاء الاصطناعي
الانجليزية
الاستعداد
التعلم

ملخص

تتمثل إحدى القضايا الجوهرية في مجال اللغة الإنجليزية في محدودية الاستقلالية المتاحة للمتعلمين ضمن تطبيقات تعلم اللغة الإنجليزية القائمة على الذكاء الاصطناعي، الأمر الذي ينعكس سلبًا على مستوى نجاح الطلبة. هدفت هذه الدراسة إلى استقصاء نية السلوك لدى الطلبة لاستخدام تقنيات الذكاء الاصطناعي، وذلك من خلال عينة مكوّنة من 110 طالبًا جامعيًا. وأظهرت النتائج المتحصّل عليها وجود نية إيجابية لدى الطلبة تجاه استخدام تقنيات الذكاء الاصطناعي. وبناءً على ذلك، أوصت الدراسة بضرورة تركيز الجامعات على تعزيز ممارسات توظيف الذكاء الاصطناعي في العمليات التعليمية للطلبة.

**** Corresponding Author:***
Email: s.almuberik@iau.edu.sa (S. Al-Muberik)

1 Introduction

Recent studies indicated the inevitable adoption of AI among institutions of higher learning, where such institutions have been investing effort and resources to improve personalized student support using AI technology (Raffaghelli et al., 2022). However, AI adoption is generally a detailed process that can be affected by various factors, particularly regarding the behavioral intentions of relevant stakeholders in the educational field. Additionally, despite the past literature on the role of AI in improving English language learning, there remains a paucity of studies investigating the factors affecting the adoption of AI technology among English language students, therefore, further studies are needed to examine the AI development in learning strategies, and this holds particular truth in the context of developing nations (Ali et al., 2024; Han, Mustafa & Kharuddin, 2025). The main objective of this study is to examine the influence of various factors on the behavioral intentions of students to use AI technologies in their English language learning process, with a particular focus on Saudi university students.

2 Methodology

This study's main objective is to examine the influence of technology readiness factors on the behavioral intentions of students to use AI technologies in their English language learning process,

with a particular focus on Saudi university students. This study implemented the adopted a quantitative approach as suggested by past studies (Venkatesh et al., 2012).

2.1 Sample of the Study

The study population consists of university-going students in Saudi Arabia as the total number of students chosen to represent the study sample was 110, with ages ranging from 18 to 22 years old.

2.2 Study Scales

The questionnaire survey for data collection was distributed to the participants and within the survey, there were variable scale adopted from relevant literature to measure students' behavioral intention to use AI (Choi et al., 2023). A total of 11 items were used to measure the above factors gauged on a five-point Likert scale (1-5), where 1 denotes strongly disagree and 5 denotes strongly agree. The items in the survey, adopted from past studies, were adjusted to align with the study's objectives. The first section of the survey was dedicated to obtaining the participants' demographic information. The second section included items measured on a Likert scale to assess respondents' perceptions of how technology readiness influence students' behavioral intentions to use AI technology.

2.3 Validity and Reliability

The items' reliability was tested and based on the tabulated values, the constructs obtained acceptable Cronbach's alpha scores that are as follows: behavioral intention to use AI technology (0.88) as shown in Table 1.

Table 1. *construct validity and reliability measurements*

variable	α
Behavioral Intention	0.88

3 Results and Discussion

The results of the study evaluation the students' behavioral intentions to use AI technologies as a learning tool in educational institutions. The results showed that the participants indicated positive intentions towards AI technology.

Table 2. *Hypotheses Testing.*

	Variable	M	Level
Level	Intention Behavior	4.02	Positive

4 Conclusion and Recommendations:

In sum, this study extends the literature and supports prior findings concerning university students' behavioral intention towards using AI technologies in the process of learning. The study revealed that the examined independent variable technology readiness did not significantly affect the behavioral intention of students towards AI technology. The practical implications for educators and policymakers are discussed in relation to the success of AI implementation in universities. Educators are advised to implement AI technology in both teaching and learning. This study has some limitations, the first of which is the use of the quantitative method. In this regard, future studies may adopt a mixed approach to identify the participants understanding on the use of AI to complete their learning and academic tasks. Another study limitation is its focus solely on university institutions. Therefore, to achieve broader generalizability of the findings, future studies can replicate the study in different educational levels and contexts.

References

Ali, O., Murray, P., Momin, M., Dwivedi, Y., & Malik, T. (2024). The effects of artificial intelligence applications in educational settings: Challenges and strategies. Technological Forecasting and Social Change, 199, 123076. https://doi.org/10.1016/j.techfore.2023.123076

Choi, S., Jang, Y., & Kim, H. (2023). Influence of Pedagogical Beliefs and Perceived Trust on Teachers' Acceptance of Educational Artificial Intelligence Tools. Int. J. Hum. Comput. Interact, 39, 910–922.

Han, M., Mustafa, H., & Kharuddin, S. (2025). AI adoption in accounting education: A UTAUT-based analysis of mediating and moderating mechanisms. Journal of Pedagogical Research. Advance online publication. https://doi.org/10.33902/JPR.202532831

Raffaghelli, J., Rodriguez, E., Guerrero-Roldan, A., & Baneres, D. (2022). Applying the UTAUT model to explain the students acceptance of an early warning system in higher education. Computer & Education, 182, 104468. https://doi.org/10.1016/j.compedu.2022.104468

Venkatesh, V., Thong, J., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology, MIS Quarterly, 36, 157–178, 2012. https://doi.org/10.2307/41410412

The International Journal of Modern Educational Trends (MET)
Vol. 02, No. 02, December 2025, pp. 18~22

The Level of implementing Problem Solving among School Teachers

Berta Garcia[1], Noor Abutayeh[2], Reda Al-Mawadieh[3]*, Munes Hamadneh[4], Ashraf Kan'an[4], Malek Jdaitawi[3], Mohammad F. Al-Abdallat[5]

[1] University of Santiago de Compostela, Spain
[2]University of Jordan, Jordan
[3]Department of Early Childhood, Zarqa University, Zarqa, Jordan
[4]Department of Classroom Teacher, Irbid National University, Irbid, Jordan
[4]Department of Early Childhood, Zarqa University, Zarqa, Jordan
[5]Department of Classroom Teacher, Zarqa University, Zarqa, Jordan

Article Info

Article history:
Received 1 April 2025
Revised 30 April 2025
Accepted 16 May 2025

Keywords:
Mathematics
Problem Solving
School
Teachers

ABSTRACT

The purpose of the study was to identify the level of implementing mathematics problem solving techniques among school teachers in Jordan. A descriptive design using survey questionnaire was used to collect data from the study participants. A total of 180 teachers were participated in this study. The results indicated that a moderate level of in terms of implementing mathematics problem solving techniques in school settings. Furthermore, insignificant differences were found between male and female teachers in terms of implementing mathematics problem solving techniques in school settings. Given these results, it was suggested that mathematics teachers give mathematical problem-solving tactics first priority and promote their ongoing application in their instruction.

الكلمات المفتاحية:

الرياضيات
حل المشكلات
المدرسة
المعلم

ملخص

هدفت هذه الدراسة إلى تحديد مستوى تطبيق تقنيات حلّ المشكلات الرياضية لدى معلمي المدارس في الأردن. وقد تم اعتماد المنهج الوصفي باستخدام أداة الاستبانة لجمع البيانات من أفراد عينة الدراسة. وشارك في الدراسة ما مجموعه 180 معلّمًا ومعلّمة. وأظهرت النتائج أن مستوى تطبيق تقنيات حلّ المشكلات الرياضية في البيئات المدرسية جاء بدرجة متوسطة. كما لم تُظهر النتائج وجود فروق ذات دلالة إحصائية بين المعلمين والمعلمات في مستوى تطبيق هذه التقنيات. وفي ضوء هذه النتائج، أوصت الدراسة بضرورة أن يُولي معلمو الرياضيات أولوية أكبر لاستراتيجيات حلّ المشكلات، والعمل على تعزيز توظيفها بصورة مستمرة ومنهجية في عملية التدريس.

**** Corresponding Author:***
Email: mjdaitawi@zu.edu.jo (M. Jdaitawi)

1 Introduction

Generally, speaking that developing student's abilities are important in all educational fields (Al-Mseidin et al., 2023; Alahmari et al., 2023). However, mathematics subject is one of the most important subject that suggested by researchers. The importance of mathematics differs from that of other sciences in its structure and nature; it is an abstract science produced by the human mind, a universal language with precise meanings, characterized by objectivity and a lack of subjectivity, and by its reliance on logic, facts, assumptions, and proofs. It has great importance in life situations, and the mathematical problem is a fundamental element of the mathematical content for various educational stages, as it contributes to developing the student's ability to link mathematics to the environment in which they live (Bani Ahmad & El-Shara, 2025; Hilbert, 2022; Wahyudi et al., 2025).

Adopting teaching techniques, practices, and approaches that put the learner at the center of the educational process, contemporary educational trends have stressed the need to concentrate on the whole development of the student. This entails a special focus on teaching scientific topics, which are central in the educational system. Such an approach calls for differentiating material presentation strategies to accommodate the specific needs of the student and reduce boredom during learning (Al-Qutaish, 2022).

Consequently, current trends in math education advise forsaking conventional techniques and substituting contemporary approaches and techniques that emphasize comprehension and understanding, offer students a stimulating learning environment, and empower them to actively participate in the educational process (Guàrdia et al., 2021; Yadgarovna & Husenovich, 2020).

Although, mathematics and teaching techniques were supported in previous studies, a lack of emphasis on problem-solving techniques and a clearly apparent weakness among students in tackling mathematical challenges were noticed. One factor contributing to this is a lack of attention on employing many approaches to teach pupils mathematical problem-solving skills, despite the clear influence these techniques have on improving pupils' performance (Simamora et al., 2019).

Most of the earlier research has concentrated on examining mathematics instructors' approaches and techniques in solving mathematical challenges, a review of those studies shows that these investigations addressed several components, including the degree of execution (as in the 2025 study of Al-Ahmari & Al-Mohammadi 2025), identifying the most frequent techniques in textbooks and classroom activities (as in Abughoush's study, 2019), evaluating planning, implementation, and classroom interaction (as in the 2025 research of Bani Ahmad & El-Shara), and creating professional development programs based on design research to improve these practices (as in Chirinda's study, 2021). Teachers show different degrees of dedication to planning, direct instruction, and the use of certain math problem-solving methods overall. Still, it is evident that their ability to apply various and complex problem-solving techniques must be improved.

Regarding methods, instrument development, and validation and reliability, past research helped the present study. It also profited from the approaches used in earlier research, including results, statistical analysis, and variable presentation. From their vantage point, the present study aims at identifying the level of implementing mathematical problem-solving techniques among school teachers in Jordan.

1.1 Study Questions

This study aimed at answering the following questions:

1. What is the level of implementing mathematical problem-solving methods among school teachers?
2. Are there any significant differences among school teachers in terms of implementing mathematics problem solving techniques based on their gender?

Study objectives

This investigation sought to determine from the level of implementing mathematical problem-solving techniques among school teachers. It also aimed at identifying the statistical differences level of implementing mathematical problem-solving techniques among school teachers based on their gender.

2 Study Methodology and Sample

The study adopted a descriptive approach using survey questionnaire to collect data from the study participants that can help to achieve its objectives. A total of 180 teachers were participated, as 75 of them were males and 105 were females as shown in table 1.

Table 1. *Descriptive of the Study Sample.*

Variable	Category	Frequency	Percentage	Total
Gender	Male	75	41.7%	180
	Female	105	58.3%	

2.1 Study Measurment

The study adopted the survey questionnaire from previous studies included Bani Ahmad and El-Shara (2025), Al-Ahmari and Al-Muhammadi (2025), and Abu Ghosh (2019), with a total of twenty-two items. The first step to validate the questionnaire, the researcher gave the first version of the survey to eight professional experts from several Jordanian education college faculties. The appropriateness and validity of the instrument in terms of comprehensiveness and content relevance were confirmed, and any required changes. However, a total of 20 items were used for the final version of the questionnaire. In terms of reliability, Cronbach's alpha coefficient, 0.89, was also used to determine internal consistency reliability. The results show a great degree of reliability, therefore increasing the instrument's credibility in measuring the desired variables as shown in table 2.

Table 2. *Cronbach's alpha internal consistency coefficient.*

Variable	Internal Consistency
Problem Solving Techniques	0.89

2.2 Study Results

The study employed a range of statistical methods appropriate to its nature and to achieving its research objectives. These included descriptive statistics and analysis of variance (ANOVA). To interpret the mean responses of the sample on the instrument's items, a five-point Likert scale was used for scoring, with scores assigned as follows: (1) very low, (2) low, (3) average, (4) high, and (5) very high. The means were categorized as follows: values of 2.33 and below represents a low level, values from 2.34 to 3.67 indicate an average level, and values from 3.68 to 5 represent a high level.

Regarding to question one, table 3 shows that, from their perspective, mathematics teachers employed a moderate level of problem-solving strategies, with a mean score of 3.58 and a standard deviation of 0.62 as shown in table 3.

Table 3. *Means and Standard of Mathematical Problem-Solving Strategies.*

Variable	Mean	Standard Deviation	Level
Problem Solving	3.58	0.62	Moderate

Regarding to question 2, which stated are there statistically significant differences between the mean scores of the study sample regarding the level of implementing mathematical problem-solving strategies among school teachers, the arithmetic means and standard deviations were calculated according to the variables of gender. Table 3 and 4 shows these results. Table 4 shows apparent differences in the arithmetic means for the degree to which mathematics teachers employ mathematical problem-solving strategies, driven by differences in gender and experience. To determine whether these apparent differences were statistically significant at the significance level ($\alpha \leq 0.05$), a one-way ANOVA was used, as shown in table 5. Table 5 shows that there are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the mean ratings of the study sample regarding the extent to which mathematics teachers employ mathematical problem-solving strategies, attributable to the gender variable. The F-value was (0.010), and the significance level was (0.921).

Table 4. *Descriptive Statistical Level of Mathematical Problem-Solving based on Gender.*

Variable	Category	N	Mean	Standard Deviation
Gender	Male	75	3.56	0.55
	Female	105	3.59	0.68

Table 5. *One-way ANOVA of the effect of gender mathematics teachers employ mathematical problem-solving strategies.*

Source of Variation	Sum of Squares	df	Mean Square	F	Significance (p)
Gender	0.004	1	0.004	0.010	0.921
Total	2373.910	180			

3 Discussion

Regarding to answer the research question, the study indicated that the participants scored moderate level in implementing mathematics problem solving techniques. The results may be attributed to the teachers' modest use of problem-solving techniques is thought to be caused by their proclivity to rely on a small number of conventional classroom activities. Some instructors also lack enough methodical training to expose them to various problem-solving strategies appropriate for several pupil levels. Furthermore, little class time and large teaching workloads might lead instructors to favor approaches that are simpler to use and faster to produce results at the price of those that need more time or more in-depth preparation and application abilities.

The most highly rated approach—modeling or sketching—is explained by its extensive employment in mathematics education. It is readily incorporated into classroom activities and directly related to visual representation abilities, which enable pupils to grasp the linkages between the parts of the issue and to understand it. The study results also presented a significant difference between teacher's gender in terms of implementing mathematics problem solving techniques. This may be attributed to the fact that, regardless of gender, mathematics teachers share a similar perception of mathematical problem-solving strategies, as their teaching practices rely more on prior experience and training than on gender differences. Furthermore, official curricula and training programs provide standardized guidelines for all teachers, promoting uniformity in classroom practice.

3.1 Study Implications

The study contributed to literature by filling the gap in terms of identifying the level of implementing mathematical problem-solving techniques among school teachers in Jordan. Additionally, the findings of this study can help mathematics curriculum designers to create suitable material, approaches, activities, and assessments so that students may successfully employ mathematical problem-solving techniques and so meet the required learning outcomes.

3.2 Recommendations

In light of the results of this study, the following recommendations can be made which are creating teacher training courses and workshops to increase the application of mathematical problem-solving techniques, with a particular emphasis on seldom-utilized ones like estimating and checking, back testing, and pattern identification. Additionally, include activities suitable for the classroom that motivate pupils to use different approaches, especially those needing deductive reasoning and disciplined planning. Finally, the study limited to small sample size, therefore, future studies should maximize the study sample.

References

Abughoush, S. (2019). Common strategies in solving mathematical problems among mathematics teachers and their students at the basic education stage. *Amman Arab University Journal for Research – Educational & Psychological Sciences, 3*(1), 204–231.

Al Ahmari, A., & Al Mohammadi, N. (2025). Assessing the level of application of strategies for solving verbal mathematical problems by female primary school teachers in Jeddah from their own perspective. *King Abdulaziz University Journal of Educational & Psychological Sciences, 4*(4), 214–239.

Alahmari, M., Jdaitawi, M. T., Rasheed, A., Abduljawad, R., Hussein, E., Alzahrani, M., & Awad, N. (2023). Trends and gaps in empirical research on gamification in science education: A systematic review

of the literature. *Contemporary Educational Technology, 15*(3), ep431. https://doi.org/10.30935/cedtech/13177

Al-Mseidin, K. I., Al-Zu'bi, M. A., Al-Mawadieh, R. S. M., & Alelaimat, A. M. (2023). The integration of AI applications in psychological and educational counselling for university students: Opportunities and challenges. In *Proceedings of the 24th International Arab Conference on Information Technology (ACIT)* (pp. 1–6).

Al Qutaysh, H. M. (2022). The effect of an educational program based on interactive online thinking tools in developing creative thinking skills in science among 10th-grade students in Jordan. *Al Quds Open University Journal for Educational & Psychological Research, 13*(39), 28–41. https://doi.org/10.33977/1182-013-039-003

Bani Ahmad, A. & El-Shara, I. (2025). Mathematics Teachers' Practices in Teaching Mathematical Problem Solving: A Qualitative Study. *Jordanian Journal of Educational Sciences, 10*(3, Suppl. 1), 343–424. https://doi.org/10.46515/jaes.v10i3.1621

Chirinda, B. (2021). Professional development for teachers' mathematical problem-solving pedagogy–what counts? Pythagoras: *Journal of the Association for Mathematics Education of South Africa, 42*(1), 1–12. https://doi.org/10.4102/pythagoras.v42i1.532

Guàrdia, L., Clougher, D., Anderson, T., & Maina, M. (2021). IDEAS for transforming higher education: an overview of ongoing trends and challenges. *International Review of Research in Open and Distributed Learning, 22*(2), 166–184. https://doi.org/10.19173/irrodl.v22i2.5206

Hilbert, D. (2022). Mathematical problems. DigiCat. https://doi.org/10.5281/zenodo.7469442

Simamora, R. E., Saragih, S., & Hasratuddin. (2019). Improving students' mathematical problem-solving ability and self-efficacy through guided discovery learning in a local cultural context. *International Electronic Journal of Mathematics Education, 14*(1), 61–72. https://doi.org/10.12973/iejme/3966

Wahyudi, W., Hidayati, N., Nurhidayah, D. A., & Jumadi, J. (2025). Learning from real problems: How the students develop their mathematical communication skills. *BIS Education, 1*, V125024–V125024. https://doi.org/10.31603/bised.172

Yadgarovna, M., & Husenovich, R. (2020). Advantages and disadvantages of working in small groups in teaching higher mathematics. *Academy, 4*(55), 65–68.

The International Journal of Modern Educational Trends (MET)
Vol. 02, No. 02, December 2025, pp. 23~27

Attitudes of teachers of gifted students towards the use of educational robots in developing students' personalities in Jordan

Noor-Azniza Ishak[1]*, Thaer Ajouly[2]; Ashraf Kan'an[2]; Osama Al-Asmar[2]
[1] University Utara Malaysia, Malaysia, noor-azniza@uum.edu.my
[2] Classroom Teacher Department, Irbid National Univesrity, Jordan

Article Info

Article history:
Received 1 April 2025
Revised 30 April 2025
Accepted 16 May 2025

Keywords:
Teachers
gifted students
Educational robots

ABSTRACT

This study sought to examine teachers' attitudes toward the use of educational robots to foster student personalities and to analyze the nature and degree of these attitudes as well as gender, academic qualifications, and years of experience variations. A descriptive-analytical approach was used; 100 instructors from Jubilee School and King Abdullah II Schools for Excellence were chosen at random. Three areas were assessed on a researcher-created questionnaire: the part educational robots play in fostering students' social and personal skills, boosting critical and creative thinking, and fulfilling student needs while enhancing the learning environment. With Cronbach's alpha = 0.95, the instrument exhibited strong validity and reliability. Results showed that teachers often had favorable attitudes (M = 3.70). The results show that, in general, teachers are strongly in favor of integrating educational robots to improve gifted pupils' personal, social, and cognitive growth, hence creating a basis for training programs and curriculum development to use robotics effectively in education.

الكلمات المفتاحية:

الخرائط الذهنية

متعة التعلم

ملخص

سعت هذه الدراسة إلى فحص مواقف المعلمين تجاه استخدام الروبوتات التعليمية لتنمية شخصيات الطلاب، وتحليل طبيعة هذه المواقف ودرجتها، بالإضافة إلى الاختلافات المتعلقة بالجنس والمؤهلات الأكاديمية وسنوات الخبرة. استُخدم المنهج الوصفي التحليلي، حيث تم اختيار 100 معلم من مدرسة اليوبيل ومدارس الملك عبد الله الثاني للتميز عشوائيًا. تم تقييم ثلاثة مجالات باستخدام استبيان أعده الباحث: دور الروبوتات التعليمية في تنمية المهارات الاجتماعية والشخصية للطلاب، وتعزيز التفكير النقدي والإبداعي، وتلبية احتياجات الطلاب مع تحسين بيئة التعلم. أظهر الاستبيان، بمعامل ألفا كرونباخ 0.95، مصداقية وموثوقية عاليتين. أظهرت النتائج أن المعلمين غالبًا ما كانت لديهم مواقف إيجابية (المتوسط = 3.70). تشير النتائج، بشكل عام، إلى أن المعلمين يؤيدون بشدة دمج الروبوتات التعليمية لتحسين النمو الشخصي والاجتماعي والمعرفي للطلاب الموهوبين، مما يُرسي أساسًا لبرامج التدريب وتطوير المناهج الدراسية لاستخدام الروبوتات بفعالية في التعليم.

**** Corresponding Author:***
Email: noor-azniza@uum.edu.my (N. Azniza)

1 Introduction

Because of ongoing technical developments, the modern educational system is changing quickly. Improving the quality of education, developing students' physical, mental, social, and academic abilities and producing its results depends on the use of digital technologies, which have become important and a basic component (Alahmari et al., 2023; Al-Mseidin et al., 2023). Among the most visible of these contemporary technologies is the use of educational robots, which offer interactive learning environments that build cognitive and practical abilities in students via

experiential learning and direct experimentation (Bai & Tian, 2025; Lampropoulos & Papadakis, 2025; Zou et al., 2025).

Given the nature and requirements of the present generation, technology is fast becoming a must-have in the educational system. In a largely digital setting, conventional approaches are no longer enough to inspire students or satisfy their learning needs. Furthermore, the knowledge revolution has changed how information is acquired, therefore requiring the deployment of technology to make curricula more interesting and interactive and to activate educational channels of communication, accounting for individual differences and varied educational demands (Dahlan, 2025; Rosen, 2025). This change has caused teachers and pupils to reassess their respective roles in the educational system.

Teachers have developed guides and facilitators instead of just transmitters of information. Students have instead evolved to be active collaborators in building knowledge via research, inquiry, engagement, and the use of a range of digital tools. This means that teachers must have sophisticated technical expertise to foster 21st-century skills in pupils, including critical thinking, cooperative work, and excellent communication (Herlinawati, 2024; Toh et al., 2016; Rahimi & Oh, 2024).

Through simulation and engagement with many learning environments (Bano et al., 2024; Chiu & Hwang, 2024; Munoz Ubando et al., 2025; Yang, 2021; Zhang & Zhu, 2024), it helps one to more clearly understand scientific and technical ideas as well as their contribution in promoting creativity. Educational studies show that using educational robots can boost learner motivation and independence, foster higher-order scientific thought abilities, and raise learning results. Additionally, it encourages cooperative learning and the creation of visually and practically symbolic representations of abstract ideas. Moreover, some research has demonstrated that using robots to learn is at least as effective as conventional techniques and may even go above it in terms of time efficiency and learning quality. This emphasizes how crucial it is to include them in several educational settings under expert supervision (Ching & Hsu, 2024; Hong, 2024; Mamatnabiyev et al., 2024; Lotriet & Gouws, 2025).

Considering how crucial it is to cultivate gifted students as a human resource contributing to society's advancement, educational robots provide a practical tool for providing learning environments rich in intellectual difficulties and ongoing stimulation, hence enhancing the development of their cognitive, emotional, and social abilities. The teacher here is absolutely crucial for the effective adoption of this technology. Studies verifying the success of educational robots in developing problem-solving abilities and producing creative ideas have sparked more research interest in analyzing teacher attitudes about their use in several academic courses (Al-Hashemi, 2018; Al-Omari & Al-Siman, 2020; Al-Ruwaili, 2018; Yeslyamov, 2024). Therefore, this study aimed at identifying teachers’ attitudes towards using educational robots in developing students’ personalities in Jordan.

2 Literature Review

This study seeks to find out teachers' perceptions regarding the employment of educational robots to shape students' characters in Jordan and to show the nature and degree of these attitudes. Furthermore, it tries to find statistically significant variations in the attitude of teachers across gender, academic credentials, and years of experience.

2.1 Study Question

What are the attitudes of teachers of gifted students in Jordan towards the use of educational robots in developing students' personalities?

2.2 Significant of the Study

The results of the study give researchers and education policy makers a crucial information foundation and aid in the creation of specialized teacher training programs for gifted students, as well

as contemporary educational curricula incorporating educational robots. This helps to raise the caliber of instruction and satisfy the psychological and academic needs of gifted children in Jordan.

3 Methodology

A descriptive-analytical method was used through a questionnaire to collect data from the study sample of 100 teachers. The study sample was based on demographic variables, namely gender, academic qualification, and years of experience. Accordingly, the study sample is described as follows:

3.1 Data Collection Tools

The researcher developed a study instrument to achieve the study's objectives, which measures the level of social interaction and its relationship to school discipline among school principals in the Wadi Al-Seer Education Directorate, from the teachers' perspective. This was done by referring to several previous studies, including Al-Akhtar and Al-Furaih (2023), Al-Juaid and Al-Ajami (2023), and Al-Ateeq (2012).

Giving the instrument in its original state to a group of Jordanian university professors confirmed its validity and reliability which was 0.95.

4 Results and Discussion

The average values and standard deviations for the dimensions measuring teachers' attitudes towards the use of educational robots, as well as for the scale overall, were determined in response to this question. The items within these dimensions were also computed for the mean and standard deviations as shown in table 1.

Table 1. *Study Sample*

	Variable	Mean	Standard Deviation	Rating
1.	Overall Attitudes Scale	3.70	0.82	High

5 Discussion

Teachers of gifted children in Jordan held both strong and middling opinions on the application of educational robots to shape pupils' personalities, as shown in Table 4. The overall mean across all dimensions was 3.70 (SD = 0.82), indicating a high level of agreement. These findings show that teachers in Oman strongly support the use of educational robots to foster different facets of gifted students' personalities. Among other reasons, the significance of educational robots in offering creative, interactive, and learning possibilities that aid in the development of pupils' social, critical-thinking, and creative abilities helps to explain this support.

Moreover, the range of teaching techniques made possible by robots provides interesting and varied learning experiences that appeals to brilliant kids, hence making the educational environment more appealing. Moreover, robots are becoming useful tools to fulfill students' needs and create a sophisticated learning environment as educational technology quickly advances.

Generally, the results show that teachers understand the added benefit educational robots provide in nurturing gifted pupils' talents, a good sign of the greater technology incorporation into the educational system.

6 Conclusion and Recommondations

In conclusion, the results of this study confirm that teachers had a high attitude towards using education arobots in teaching and leanring. Based on the results, the investigator suggests that the decision makers should create an instructional program that emphasize using robots to improve student critical thinking, creativity, cooperation, and coordination. Furthermore, using this with a

range of educational groups and samples, and carrying out more study and research on teachers' perspectives on using educational robots.

References

Alahmari, M., Jdaitawi, M. T., Rasheed, A., Abduljawad, R., Hussein, E., Alzahrani, M., & Awad, N. (2023). Trends and gaps in empirical research on gamification in science education: A systematic review of the literature. *Contemporary Educational Technology, 15*(3), ep431. https://doi.org/10.30935/cedtech/13177

Al-Akhtar, N., & Al-Furaikh, N. (2023). Effectiveness of an enrichment program based on employing educational robotics in developing innovative thinking among gifted female students. *Scientific Journal of Qualitative Education Sciences, 1*(17), 1341–1372.

Al-Ateeq, I. (2012). *The role of educational robotics programs* in *developing creative skills among gifted secondary school students: A comparative study* (Unpublished master's thesis). Al-Balqa Applied University, Jordan.

Al-Hashemi, S. (2018). Effectiveness of adaptive hypermedia in developing educational robot programming skills among middle school students. *Journal of Research in Specific Education Fields, 4*(17), 1–36.

Al-Juaid, N., & Al-Ajmi, L. (2023). The level of secondary school teachers' awareness of the importance of using educational robotics in achieving science learning outcomes. *Arab Journal for Scientific Publishing, 6*(62), 179–209.

Al-Mseidin, K. I., Al-Zu'bi, M. A., Al-Mawadieh, R. S. M., & Alelaimat, A. M. (2023). *The integration of AI applications in psychological and educational counselling for university students: Opportunities and challenges.* In Proceedings of the 24th International Arab Conference on Information Technology (ACIT) (pp. 1–6).

Al-Omari, M., & Al-Sulaiman, B. (2020). The effect of using educational robotics on developing spatial reasoning skills among fourth-grade students in mathematics. *Journal of Humanities and Social Sciences, 1*(57), 299–330.

Al-Ruwaili, M. (2018). Evaluation of gifted programs from the perspectives of school leaders, teachers, and students: A field study in Turaif Governorate. *Scientific Journal of* Research *and Publishing, 34*(3), 221–238.

Bai, S., & Tian, P. (2025). Educational robotics may enhance students' conceptual knowledge, applied skills, and learning attitudes in STEM education: A meta-analysis. *Educational Technology & Society, 28*(4), 274–303. https://doi.org/10.30191/ETS.202510_28(4).SP06

Bano, S., Atif, K., & Mehdi, S. A. (2024). Potential effectiveness of educational robotics for 21st-century skills development in young learners: A systematic review. *Education* and *Information Technologies, 29*(9), 11135–11153.

Chiu, M. C., & Hwang, G. J. (2024). Enhancing students' critical and creative thinking through an integrated mind-mapping and robot-based learning approach. *Education and Information Technologies, 29*(17), 22779–22812.

Dahlan, M. M. (2025). *Edutainment in the digital* age*:* Blending *learning and fun*. Universiti Poly-Tech Malaysia.

Herlinawati, H., Marwa, M., Ismail, N., Liza, L. O., & Situmorang, D. D. B. (2024). The integration of 21st-century skills in the education curriculum. *Heliyon, 10*(15).

Hong, L. (2024). The impact of educational robots on students' computational thinking: A meta-analysis of K–12 studies. *Education and Information Technologies, 29*(11), 13813–13838.

Lampropoulos, G., & Papadakis, S. (2025). The educational value of artificial intelligence and social robots. In *Social robots in education* (pp. 3–15). Springer.

Lotriet, H. H., & Gouws, P. M. (2025). Educational robotics in physics education: A systematic review. *Studies in Science Education*, 1–30.

Mamatnabiyev, Z., Chronis, C., Varlamis, I., Himeur, Y., & Zhaparov, M. (2024). A holistic approach to using educational robots in computer science courses. *Computers, 13*(4), 102.

Rahimi, R. A., & Oh, G. S. (2024). Rethinking the role of educators in the 21st century: Navigating globalization, technology, and pandemics. *Journal of Marketing Analytics, 12*(2), 182–197.

Rosen, L. D. (2025). *Rewired: Understanding the iGeneration and the way they learn*. Macmillan.

Toh, L., Causo, A., Tzuo, P., Chen, I., & Yeo, S. (2016). A review on the use of robots in education and with young children. *Educational Technology & Society, 19*(2), 148–163.

Yeslyamov, S. (2024). Application of software robots using artificial intelligence technologies in university education. *Journal of Robotics and Control, 5*(2), 359–369.

Zou, Y., Kuek, F., Feng, W., & Cheng, X. (2025). Digital learning in the 21st century: Trends, challenges, and innovations in technology integration. *Frontiers in Education, 10*, 1562391.