

Artificial Intelligence Mediating Curriculum Design and Early Childhood Social Skills

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ABSTRACT:

The proposed research works on the mediating effect of Artificial Intelligence (AI) in the connection between the design of a digital curriculum and the building of social skills and an effective learning process in early childhood learners. The research design was a quantitative one and the instruments used to gather data were a structured survey that was administered to 357 educators and curriculum experts. The associations between the variables of the study were analyzed using descriptive and inferential statistics and linear regression analysis.

The results indicate that AI is positively affected by the digital curriculum design that, in turn, has a positive effect on the development of social skills and learning effectiveness. Moreover, digital curriculum design also improves the social skills and the learning outcomes directly. The findings indicate that AI integration in digital curricula can enhance individual learning, engagement, and the quality of early childhood education in general.

This study empirically supplements the concept of AI as a mediating variable to early childhood education and offers valuable implications that can be applied by teachers, curriculum designers, and policymakers to maximize the application of digital curricula.

Keywords: Digital Curriculum Design, Artificial Intelligence, Social Skills Development, Learning Effectiveness, Early Childhood Education, Mediating Role.

1. INTRODUCTION

The fast adoption of technology in the field of education has also changed the conventional learning methods especially in early childhood education. The use of digital curriculum as an approach that uses digital tools, multimedia materials and interactive platforms has become a key element in creating learning experiences among young children [1], [5]. Digital curricula, as opposed to traditional ones, are created to induce engagement, interactivity, and customized

learning paths so that children could acquire cognitive, emotional, and social skills in more dynamic forms [6], [8]. Nonetheless, the efficiency of digital curricula lies not alone on the design of the curriculum itself but on the tools and technologies that mediate its application as well. Artificial intelligence (AI) is one of the greatest mediating variables in the present day education system, which can serve as an adaptive, responsive, and personalized agent within the learning process [2], [9].

Artificial intelligence presents many opportunities in the technological advancement of early childhood education. Through analyzing student interaction patterns, learning behavior patterns and performance, AI may offer educators real-time feedback, suggest individualized learning activities, and locate areas that need specific intervention [1], [4]. As an illustration, the complexity of assignments provided by AI-based educational tools can be modified according to the response time and accuracy of a child who is offered the most suitable cognitive challenge that does not exceed the developmental stages [3], [14]. Also, AI can support the growth of social skills, promoting collaborative problem-solving activities, interactive storytelling, and virtual social interactions that tend to replicate the real life experience [10], [11].

This is why AI can be seen as not only a technological instrument but also as one of the instrumental resources that will connect the process of designing a digital curriculum and the developmental success of children. The nurturing of social skills and efficiency during early childhood is a supporting factor of the holistic education. Social skills, including communication, empathy, cooperation, and emotional regulation, are significant in how a child can communicate well with peers, educators, and the surrounding [6], [16]. At the same time, the level of educational performance, which can be assessed as the level of learning, the level of accomplishment of the tasks, as well as cognitive development, indicates how effective the educational interventions will be in terms of reaching their goal [5], [17].

The interaction between AI and the development of digital curriculum presents an opportunity to achieve social competence and learning efficiency. When AI is used as an intermediate, the educators will be able to investigate the effect of technologically mediated interventions on the social environment of children, the level of engagement, and the general developmental outcome [7], [9]. Although digital curricula and AI are becoming more prevalent in education, the

studies investigating the interaction of these two resources on early childhood development are scarce, especially at the level of empirical and field studies [1], [8]. The majority of studies concentrate on technological innovation or the outcomes of child development in isolation of the mediating influence that AI can have in converting the digital curriculum design into quantifiable developmental benefits [2], [4].

Thus, this paper attempts to fill this gap through an exploration of AI as a mediator in the association between the design of digital curriculums and the acquisition of social skills and effectiveness in early childhood children. The research will use an analytical field study to offer evidence-based information on how AI-enhanced digital curricula will support holistic early childhood development to the curriculum developers, teachers, and policymakers [1], [9].

2. Study Problem and Questions:

In spite of the increased focus on digital education, a significant number of early childhood programs cannot adequately embrace technology in a manner that promotes their learning outcomes, as well as social skills enhancement. Conventional digital programs do not tend to follow individual needs of learning and to offer the mechanisms, which improve the social interaction, restricting their overall efficiency. The artificial intelligence with its adaptive and personalized qualities may offer the solution as it may act as a mediator between designing digital curriculum and tangible enhancements of social and cognitive development in children. Nevertheless, only a small amount of empirical evidence has proven the role of AI in this particular case (Ozturk, 2025). As a result, teachers and curriculum developers are not given clear directions on how to use AI to optimize the acquisition of social skills, as well as educational performance in early childhood education.

This paper will respond to this issue by considering the ways of AI intervening in the correlation between the design of the digital curriculum and the developmental results of

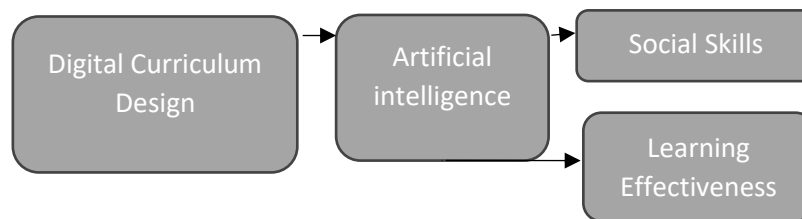
young children. Particularly, it aims to know how AI can be used to facilitate effective curriculum delivery, personalize learning experiences, as well as facilitate social interaction among children. The next questions can be attributed to the Study Problem:

1.How can AI mediate the connection between designing the digital curriculum and the emergence of social skills among early childhood children?

2.What is the effect of AI on the efficacy of digital curriculum interventions to enhance learning outcomes?

3.How much does the integration of AI improve interaction, engagement, and social cooperation of children in digital learning settings?

4.What are the implications of integrating AI into early childhood digital curriculum that would be of help to educators and curriculum developers?



3. Theoretical Framework

3.1 Digital Curriculum Design

• Concept of Digital Curriculum Design

Digital curriculum design is a systematic approach to planning, designing, delivery, and assessment of educational programs and learning experiences with the use of digital technologies. It combines the lifelong pedagogy and digital resources like educational applications, interactive websites, e-learning materials, and multimedia content to improve the teaching and learning process (Su and Zhong). Digital curriculum design does not consist of digitalizing textbooks or internet lectures anymore. Instead, it focuses more on interactivity, personalized learning, and incorporation of modern technologies such as artificial intelligence (AI) to facilitate student-centered learning (Su et al., 2023; Chen and Li, 2025). It works on various levels of learning, such as thinking, mastering skills, and socialization, in a dynamic and flexible setting (Bers, 2020; Özdemir Beceren et al., 2025).

3 Importance of Digital Curriculum Design

Digital curriculum design is important in that it enables learners to be ready to the digital age and

facilitate meaningful learning outcomes. Among the prominent advantages, one should note (Chen and Li, 2025; multimedia content to improve the teaching and learning process (Su and Zhong, 2022; Ozturk) :

1.Increased Interaction: New technology, including simulations, gamification and interactive multimedia, attracts the attention of learners and motivates them.

2.Individualized Learning: Digital curricula have the ability to meet the requirements of individual learners in terms of speed, level of comprehension, and learning style, leading to increased understanding and retention.

3.Skill Development: Digital curricula can aid the acquisition of 21 st century skills in problem-solving, creative thinking, collaboration, and creativity, besides academic knowledge.

4.Accessibility and Flexibility: Digital curricula open up opportunities outside the classroom that allow remote learning and access of learners with various needs.

5.Integration with Artificial Intelligence: AI can interpret the performance of students and forecast their learning results and offer adaptive feedback, which makes the design of a digital curriculum more efficient and effective.

These advantages make the design of digital curriculums a direct contributor to the enhancement of social skills of learners, their effectiveness and general development.

3.2 Development of Social Skills and Effectiveness

3 Concept of Social Skills and Effectiveness

Social skills can be defined as the complex of mastered behaviors and abilities that help people to relate to others in different social situations properly, harmoniously, and correctly. The effectiveness, here, is the skill to allow children to reach desired results in the learning and social processes when cognitive, emotional, and social competencies are efficiently applied (Bagea et al., 2023; Sabir et al., 2025). Some behaviors that are included in social skills include cooperation, empathy, communication, conflict resolution and active listening. Effectiveness, conversely, is a measure of how these skills can be applied in a practical way in order to accomplish tasks, resolve problems, and make a positive contribution to group outcomes (Eckhardt and Egert, 2018; Kaplan-Berkley, 2022). Social skills and effectiveness can be improved with the help of AI and digital curricula which offer interactive, adaptive, and collaborative learning environments that contribute to the development of these competencies (Özdemir Beceren et al., 2025; Pu et al., 2024).

4 Components of Social Skills and Effectiveness

It is a multidimensional process that defines social development and effectiveness in early childhood, such as Bagea et al., 2023; Sabir et al., 2025:

1. Communication Skills: This is the skill of being able to convey ideas, active listening and responding accordingly verbally and non-verbally.
2. Emotional Regulation: Awareness, perception and control of own emotions as well as being sensitive to emotions of other people.

3. Cooperation and Collaboration: This is by working in groups, sharing resources, and pursuing shared objectives.

4. Conflict Resolution: It is the ability to effectively address disagreements and propose solutions that will please everyone.

5. Problem-solving and decision-making: The use of critical thinking and reasoning to make effective decisions.

6. Self-efficacy and Responsibility: Building an ability of confidence in oneself and being in favor of their actions.

These elements are vital during the early childhood stage, as they lay the basis of academic success, emotional and life-long interpersonal relations. Curriculum design, especially digital curriculum, could have a profound impact on the acquisition of these skills as it can offer structured space to interact, receive feedback and practice.

3.1 Artificial Intelligence

• Definition of Artificial Intelligence

Artificial intelligence (AI) is a branch of computer science that focuses on creating machines and systems capable of performing tasks that in the vast majority of cases require the use of human intelligence. They are learning, reasoning, problem-solving, natural language, pattern recognition, and decision-making tasks (Chen and Li, 2025; Ozturk, 2025). The AI systems process the data based on the algorithms, data processing, and adaptive learning techniques to provide solutions or predictions (Sabir et al., 2025; Su et al., 2023).

When applied to the learning process, AI is currently being implemented in the education field to increase the learning process, personalize instruction, evaluate performance, and provide adaptive feedback. Some examples of AI tools include intelligent tutoring system, chatbots, recommendation systems, and predictive analytics platforms (Özdemir Beceren et al., 2025; Pu et al., 2024; Su and Zhong, 2022).

• **The Role of AI in Digital Curriculum Design and Social Skills Development**

AI is a mediator between digital formulation of the curriculum and acquisition of social skills and effectiveness. It has made contributions in the form of (Su & Zhong, 2022):

1. Adaptive Learning: AI has the ability to examine the student interaction with online materials in a manner that enables the learning process to be customized so it is ensured that the learner is exposed to content that matches their level of skills or learning speed.

2. Individualized Feedback: According to AI-driven processed feedback, students obtain immediate, personalized feedback that spurs self-reflection, self-growth, and cognitive, as well as social, competency mastery.

3. Social Interaction Enhancement: AI-powered systems can recreate social situations, group projects, and role-playing activities that enable children to train social skills in safe and controlled situations.

4. Monitoring and Assessment: AI tools will be able to measure the progress of social skills, emotional regulation and learning effectiveness, and they give educators information they can act upon in order to enhance instruction.

5. Motivation and Engagement: smart gamification and adaptive challenges promote the active engagement, collaboration and persistence, which leads to development of the social skills and efficiency in the tasks.

With the addition of AI to the digital curriculum design, teachers have an opportunity to design a dynamic learning environment that will facilitate cognitive and social growth of early childhood learners. AI becomes an intermediary that converts digital content into valuable experiences that may help to develop social interactions, teamwork, and practical use of skills.

4 Previous studies

Ozturk, E. (2025). The use of Artificial Intelligence in Early Childhood STEM Education: a review of pedagogical paradigms,

ethics concerns, and socio-political consequences. This paper was a review of how artificial intelligence (AI) can be used in early childhood STEM education in terms of pedagogical paradigms, ethical issues, and socio-political concerns. It reviewed the literature and paradigms of interest, including the cognitive development of Piaget, socio-cultural learning of Vygotsky and ecological systems of Bronfenbrenner through a theoretical and analytic review approach. There was no definite sample of the participants in the study, but the global studies were analyzed. The results were that AI has potentials of personalized learning, game-based learning, and data-driven progress monitoring, and ethical and political threats such as privacy threats, algorithm bias, and possible cognitive and social developmental effects. The paper suggests to create ethical, humanistic, and inclusive AI-based curricula, educate teachers, engage families, and take an interdisciplinary approach to implementation sustainability .

Ozdemir Beceren, B., Saritaas, S and Baydemir, C. (2025). Digital companions in the early childhood education Digital companions in the early childhood education: a scoping review on the potential of chatbots to support social-emotional learning. The research problem of the study was to map studies on the topic of AI-powered chatbots in the context of supporting social-emotional learning (SEL) in early childhood (08 years). It applied a scoping review (PRISMA-ScR) to screen 205 articles and pick 13 that are relevant, most of which are in 2023-2024. The sample consisted of experimental, applied, and theoretical research of different countries. The findings indicated that chatbots mostly assisted with self-awareness and self-management/emotion regulation, whereas such skills as relationship building and responsible decision-making were not discussed so much. Some of the technologies were natural language processing, emotion recognition, multimodal interfaces and embodiment. The recommendations highlight that chatbots will not be able to substitute such human interaction; more experimental research, reflexive

pedagogical planning, ethical models, and assessment of long-term effects should be done .

Lee, C., & Xiong, J. (2024). To Keyboard, Chatbot: A Large Language Model-based Integration Platform to Teach Young Children Computational Thinking. This research had a mission to develop an AI full-fledged system of large language models (LLM), chatbots, and physical robots to instruct young children (4–9 years) on computational thinking (CT) without using the keyboard input. The design research approach meant that the platform was developed, and children could formulate tasks using natural language, which will turn into step-by-step programs being performed by robots. There was no particular sample size, as the study was on platform functionality. The findings showed that this method made the concepts of CT real and comprehensible, which made it easier to think algorithms, sequence, and decompose among children. It is suggested that the early CT education can be improved using the platforms based on the idea of LLM, in case they are age-effective and cognitively accessible .

Silva, E. F., Dembogurski, B. J., and Semaan, G. S. (2021). The Systematic Review of the Computational Thinking at Early Ages. The objective of the study was to conduct a review of initiatives, tools, and methods that are applied to teach computational thinking (CT) to children in preschool and early childhood to 2020. A systematic review was used to analyze 31 studies with 3 qualitative papers internationally. Educational interventions involved ScratchJr, KIBO robots, and physical/tangible playful tools were used as a sample. Findings revealed that abstract concepts are intelligible by using activities that have been properly designed to teach CT skills at young ages. The research suggested that integrating play, physical activity, and experimentation should be used and not just screens, and valid instruments should be established to measure CT skills in the long-term .

Ching, Y.-H., & Hsu, Y.-C. (2023). Robotics in education: Systematic Review of Educational

Robotics to facilitate the development of computational thinking in young learners. This paper sought to test the hypothesis of how educational robotics enhances the development of computational thinking (CT) in children between pre-K and grade 6. A systematic review was used to examine 22 empirical studies (2012-2021), based on multiple countries. Findings indicated that robotics activities enhance sequencing, conditionals, and loops, debugging and algorithmic thinking, and tools such as LEGO Mindstorms. Some of the best strategies were collaborative learning, project based learning, and embodied learning. It was also recommended to include robotics in formal education, provide teacher education, and picture age-related CT exercises .

Rodríguez, A. (2025). Role of the Artificial Intelligence (AI) in Early Years Education: A Qualitative Study. This qualitative research paper was set to be conducted to understand the views of teachers and educators regarding the use of AI in early-year education. Semi-structured interviews were carried out on 15 early childhood educators in various schools in Latin America. The results demonstrated that the use of AI increased individualized learning and interaction but raised the issue of screen time and data privacy, as well as needed technological dependency in children. It was advised that close integration of the curriculum, training of teachers on AI literacy, and continuous observation of the effects of child development be done to make sure AI is used safely and effectively in the early childhood environment.

5 Feedback on previous studies:

The purpose of the present research is to examine the artificial intelligence (AI) as a mediating factor in the correlation between the design of digital curriculum and the acquisition of social skills and effectiveness in early childhood. Most of the earlier research is congruent with the present one in identifying the possibility of AI enhancing personalized learning, engagement, and skill development among young children. As an example, Ozturk (2025) highlights the possibility

of AI to assist in the individualized learning and data analysis, which may appeal to the present study on the efficiency of digital curriculum. In the same manner, Rodriguez (2025) emphasises the role of AI in custom learning and interaction, which advocates the fact that AI can mediate the outcomes of the curriculum. The role of AI in social-emotional learning (SEL) and especially in self-awareness and emotion regulation is another important theme that is highlighted by Özdemir et al. (2025) and that correlates with the specific social skills development that is covered by the current study.

Nevertheless, the differences arise in terms and procedure. Past literature mostly utilizes theoretical reviews, scoping reviews, or qualitative research and conduct an analysis of platforms, tools, or teacher attitudes, frequently lacking empirical field work on children. Conversely, the present research is an analytic field approach, which has a direct influence on the mediating role of AI on social skills and effectiveness in digital curricula, empirically validated. Moreover, the current study has a broader scope of the research, covering computational thinking and robotics, than the previously reviewed studies, such as Lee and Xiong (2024) and Silva et al. (2021). The idea of ethical considerations and screen-time raised by Ozturk (2025) and Rodriguez (2025) has been mentioned though not the main focus in the given research, which focuses on the practical design of a curriculum and the functional influence of AI.

Overall, the above-mentioned sources help to verify the theoretical background and the possible advantages of AI although the present research goes beyond them by offering empirical evidence of the mediating nature of AI in social skills development and curriculum efficacy in early childhood.

6 METHOD

The research is quantitative in nature as it uses the mediating role of artificial intelligence (AI) in the connection between the two factors (design of the digital curriculum and the development of

social skills) and the outcome (learning effectiveness) in children at an early age.

5 Study Population and Sample

The research population was composed of kindergarten teachers. A stratified random sampling technique was applied to sample out 357 teachers to represent all groups, and each participating educational institution was sampled proportionate to its size.

6 Questionnaire and Data Collection Tools and Number of Questionnaires.

Single structured questionnaire was used as a source of data collection, which included all the important variables: digital curriculum design (independent variable), artificial intelligence (mediating variable), development of social skills (first dependent variable), and learning effectiveness (second dependent variable). A sample of early childhood teachers was given this questionnaire. Through the data obtained during the survey, the following were performed:

Descriptive analysis to generalize the demographic features and important points of the variables;

Regression analysis to investigate the effects of the digital curriculum design on development of social skills and learning effectiveness, as well as, artificial intelligence;

Path analysis to investigate the mediating position of artificial intelligence.

7 Validity and Reliability of the Instruments

Reliability and validity of the survey were ensured by the examination of the survey by the experts of education and digital curricula. After screening through them, their comments were included and changes made accordingly. Also, a pilot study was done to get a final version of the survey before administering it to the necessary sample of early childhood educators to guarantee the correctness of the outcomes.

Cronbach alpha was used to ensure the reliability of the instrument. The findings revealed that all

the study variables were over 0.8 hence meaning the high reliability of the instrument and its applicability in generalizing the results.

Table 1. Internal consistency reliability of biology test

Variable	Number of Items	Cronbach's Alpha	Reliability Level
Digital Curriculum Design	6	0.88	High
Artificial Intelligence (AI)	8	0.91	High
Social Skills Development	8	0.90	High
Learning Effectiveness	7	0.89	High

8 Methods of Statistical Analysis.

The data will be analyzed using the SPSS and AMOS statistical analysis software programs. This will enable the estimation of the direct and indirect effects of the digital curriculum design on building social skills and efficacy of learning by using artificial intelligence as a confounding factor.

9 Descriptive Statistic of Demographic Data.

The descriptive analysis of demographic data will help to have a clear picture of the study sample in terms of gender, educational qualification, years of experience, and place of employment. This analysis aids in the distribution of the participants in the sample and then moves to the analysis of the variables of the study which are the main variables. The 357 respondents were used to collect data and summarize it using frequencies and percentages of each category of demographic data.

Table 2: Descriptive Analysis of Demographic Data (N = 357)

Variable	Category	Frequency	Percentage (%)
Gender	Male	175	49.0
	Female	182	51.0
Educational Qualification	Bachelor's Degree	240	67.2
	Postgraduate	117	32.8
Years of Experience	Less than 5 years	120	33.6
	5–10 years	145	40.6
	More than 10 years	92	25.8
Workplace	Kindergarten	180	50.4
	Primary School	150	42.0
	Other	27	7.6

On gender, it was relatively balanced with 49 percent males and 51 percent females, and this represented both genders with equal representation in the sample. Regarding educational qualification, most participants were

bachelors (67.2%), with 32.8% being postgraduate, which shows that the sample participants had appropriate education. In terms of work experience, 40.6% of the participants had 5-10 years work experience, 33.6% had less than

5 years work experience and 25.8% had over 10 years work experience and there was a diversity in the professional experience. In terms of their workplace, the findings revealed that almost half of the participants are employed in kindergartens (50.4%), 42% in early primary schools, and 7.6% in other settings, which were good enough to cover all kinds of early childhood education settings. This distribution shows that the chosen sample was appropriate in conducting the research and processing the effect of digital curriculum design and artificial intelligence on social

10 Analysis of Study Variables.

This part of the paper will attempt to offer a descriptive analysis of the main variables of the model, including the design of digital curriculum, the development of artificial intelligence, the development of social skills, and the effectiveness of learning. The analysis represents how the participants have responded to each questionnaire item in terms of the mean and the standard deviation. This assists in finding out the general degree of agreement between the participants towards each item and learns the efficacy of the variables under the study set-up.

Table 3: Descriptive Analysis of Study Variables (N = 357)

Variable	Mean	Standard Deviation (SD)
Digital Curriculum Design	3.14	1.05
Artificial Intelligence (AI)	3.71	0.79
Social Skills Development	3.39	1.17
Learning Effectiveness	3.36	1.25

In the table, the descriptive analysis of the main variables of the study is provided, namely the design of digital curriculum, the development of social skills, and learning effectiveness, which was carried out on a sample of 357 participants. The scores display that the average score of digital curriculum design was 3.14 with a standard deviation of 1.05 which means that there was moderate agreement among respondents on the effectiveness of the design of the curriculum. The awareness of the participants about the significance of artificial intelligence was rated at 3.71 with standard deviation of 0.79, which is considered the mean score of the ratings. On the dependent variables scores, the development of social skills had a mean of 3.39 and a standard deviation of 1.17 whereas learning effectiveness had a mean of 3.36 and a standard deviation of 1.25. This shows that there was a moderate evaluation of the role of digital curriculum and artificial intelligence on the social and cognitive development of children by the participants. Overall, these values represent a rather favorable tendency towards the four variables, which allows

considering the opportunities to investigate the direct and indirect correlations and impacts in the study model.

11 Data Normality Test

The skewness and kurtosis of the data showed the normality of the data distribution of each study variable before the inferential statistical analysis took place. Skew shows the evenness of the data distribution around the mean whereas kurtosis shows the shape of the tail of the distribution compared to a normal distribution. Any data distribution is generally said to be normal when it has a skewness and a kurtosis value of -2 to +2 since this is the recommended range of skewness and kurtosis values by recent statistic literature (George and Mallery, 2010).

The outcomes in the table below () represent the fact that skewness and kurtosis values of all research variables, such as the digital curriculum design, artificial intelligence, development of social skills, and learning effectiveness, are within the acceptable range of -2 to +2. This shows that the data are not spread far away and it is safe to

apply inferential statistical tests like regression analysis and path analysis. Hence, the results of

the study may be trusted without transforming data and applying non-parametric statistical tools.

Table 4: Assessment of Normality for All Components (Sub-Items)

Sub-Item	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
D1	-0.876	0.191	0.940	0.380
D2	-0.630	0.191	0.481	0.380
D3	-1.105	0.191	1.336	0.380
D4	-1.174	0.191	1.307	0.380
D5	-1.312	0.191	1.400	0.380
D6	-1.093	0.191	1.313	0.380
AI1	-1.181	0.191	1.545	0.380
AI2	-1.110	0.191	1.489	0.380
AI3	-1.033	0.191	0.575	0.380
AI4	-1.021	0.191	1.728	0.380
AI5	-0.682	0.191	1.181	0.380
AI6	-1.925	0.191	0.117	0.380
AI7	-0.853	0.191	3.939	0.380
AI8	-0.849	0.191	0.217	0.380
S1	-1.190	0.191	0.821	0.380
S2	-0.945	0.191	1.970	0.380
S3	-1.236	0.191	0.938	0.380
S4	-1.398	0.191	1.254	0.380
S5	-0.958	0.191	1.850	0.380
S6	-0.760	0.191	1.087	0.380
S7	-1.456	0.191	0.754	0.380
S8	-1.200	0.191	3.089	0.380
L1	-1.190	0.191	2.140	0.380
L2	-0.985	0.191	0.988	0.380
L3	-1.201	0.191	0.729	0.380
L4	-0.849	0.191	0.217	0.380
L5	-0.853	0.191	3.939	0.380
L6	-1.211	0.191	0.929	0.380
L7	-1.036	0.191	0.838	0.380

12 Linear Regression Analysis

Linear regression analysis was performed in order to investigate the direct impact of the independent (Digital Curriculum Design) and mediator (Artificial Intelligence) on the dependent variables (Social Skills Development and Learning Effectiveness). This statistical technique aids in determining the strength and

direction of the relationship between variables, as well as give the beta coefficient, t-value, level of significance, and R² of any given model.

Based on the analysis, it is also possible to conclude whether there is any statistically significant relationship between two variables, which supports or dismisses each of the hypotheses of the study.

Table 5: Effect of Digital Curriculum Design on Artificial Intelligence (H1.1)

Model summary			ANOVA		
R			R Square	F	Sig.
0.586			0.343	194.869	0.00
Coefficient					
	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	<i>B</i>	std. Error	Beta		
Constant	1.430	0.166		8.637	0.00
Digital Curriculum Design	0.604	0.043	0.586	13.960	0.00

The findings indicate that design of digital curriculum positively affects artificial intelligence (0.586, $t = 13.960$, $p < 0.001$). The model accounts 34.3% of the variance in artificial

intelligence ($R^2 = 0.343$), which reveals that there is a good relationship between the design of digital curriculum and the increased use of AI. This result is in favor of hypothesis H1.1.

Table 6: Effect of Artificial Intelligence on Social Skills Development (H1.2)

Model summary			ANOVA		
R			R Square	F	Sig.
0.601			0.361	217.926	0.00
Coefficient					
	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	<i>B</i>	std. Error	Beta		
Constant	1.364	0.161		8.467	0.00
AI	0.627	0.041	0.601	14.762	0.00

Artificial intelligence had a high positive effect on the development of social skills ($\beta = 0.601$, $t = 14.762$, $p = 0.001$). The model indicates that 36.1% of social skills ($R^2 = 0.361$) have been explained,

which proves the efficiency of artificial intelligence in facilitating children in their interaction and building their collaborative skills. These findings prove hypothesis H1.2.

Table 7: Effect of Artificial Intelligence on Learning Effectiveness (H1.3)

Model summary			ANOVA			
R			R Square		F	Sig.
0.433			0.187		85.209	0.00
Coefficient						
	Unstandardized Coefficients		Standardized Coefficients		T	Sig.
	<i>B</i>	std. Error	Beta			
Constant	2.267	0.159			14.226	0.00
AI	0.372	0.40	0.433		9.231	0.00

The regression analysis reveals that the effect of artificial intelligence on the effectiveness in learning is positive (0.433 , $t = 9.231$, $p < 0.001$) but the model explains a lower percentage of the variance ($R^2 = 0.187$) meaning that other variables also determine the effect of learning

outcomes. However, the results confirm hypothesis H1.3 and prove the importance of artificial intelligence in improving the performance of children at school and their degree of interest in the learning process.

Table 8: Effect of Digital Curriculum Design on Social Skills Development (H1.4)

Model summary			ANOVA		
R			R Square	F	Sig.
0.609			0.371	119.904	0.00
Coefficient					
	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	<i>B</i>	std. Error	Beta		
Constant	0.013	0.292		0.045	0.964
Digital Curriculum Design	0.843	0.077	0.609	10.950	0.00

Regression analysis indicates that digital curriculum design has a strong positive effect on the development of social skills (0.609 , $t = 10.950$, $p = 0.001$), and the model describes the computed percentage of variance ($R^2 = 0.371$).

These findings confirm hypothesis H1.4 which states that structured and interactive online curriculum improves interaction and collaborative skills of children.

Table 9: Effect of Digital Curriculum Design on Learning Effectiveness (H1.5)

Model summary			ANOVA		
R			R Square	F	Sig.
0.514			0.264	15.256	0.00
Coefficient					
	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	<i>B</i>	std. Error	Beta		
Constant	1.364	0.161		8.467	0.00
Digital Curriculum Design	0.627	0.042	0.514	14.762	0.00

It was found that the design of digital curriculum is effective to a great extent ($\beta = 0.514$, $t = 14.762$, $p < 0.001$) and can account for 26.4 percent of the variation ($R^2 = 0.264$). This observation confirms hypothesis H1.5, which proves that a properly designed digital curriculum can lead to a positive effect on the achievement and learning results of early childhood children.

13 Results Discussion and its Relation to the past research.

The findings of the linear regression analysis in the given research suggest that the effect of digital curriculum design on the artificial intelligence (AI) is statistically significant and positive, and the effect of AI on the growth of social skills and learning performance in early childhood is also

positive. The digital curriculum design had also a direct impact on the evolvement of social skills and the effectiveness of learning, which validates the key part of digital curriculum and artificial intelligence as the mediator of enhancing the educational and social performance of children.

These findings are congruent with other researchers. Ozturk (2025) affirmed that AI has a high potential of reinforcing personalized learning and data-driven follow-up, which improves the effectiveness of digital curriculum design in personalized learning. In a similar manner, Rodriguez (2025) proved that AI application in early childhood education provides more opportunities in the form of personalized learning and interaction without dismissing the necessity of supervision and monitoring children. This shows the significance of AI as a successful intermediary between the creation of digital curriculum and the creation of social skills and learning efficacy.

In terms of social skills, the results of the study complement those of Özdemir et al. (2025), who stated that AI-enhanced educational applications increase the level of self-awareness and emotional regulation in children, which is consistent with the learning of social interaction and cooperation skills in the present study. Moreover, the literature review of computational thinking and robotics indicates that the combination of technological platforms with practical tasks can be introduced to comprehend the concepts and facilitate early learning (Lee and Xiong, 2024; Silva et al., 2021; Ching and Hsu, 2023) to justify the efficacy of an AI-based digital curriculum.

Nonetheless, this study is not similar to the earlier researches in their approach and methodology. Although majority of past researches have been theoretical reviews or qualitative research, the current research gives first-hand empirical evidence regarding the influence of AI as a mediating variable on social skills and learning effectiveness. This reinforces the research and gives realistic evidence to supplement the theoretical information. Additionally, the consideration of the study is much wider

compared to the previous ones that concentrated on certain tools or platforms without connecting them to the digital curriculum in the broad sense. This enhances the holistic nature of the present findings and their implications to practice in the area of early childhood education.

On the whole, these findings indicate the significance of the incorporation of artificial intelligence into designing digital early childhood programs with the perspective of improving social skills and learning outcomes. This is in line with the majority of past researches and it offers new empirical evidence to justify this trend.

14 Conclusion

The findings of the linear regression analysis in the given research suggest that the effect of digital curriculum design on the artificial intelligence (AI) is statistically significant and positive, and the effect of AI on the growth of social skills and learning performance in early childhood is also positive. The digital curriculum design had also a direct impact on the evolvement of social skills and the effectiveness of learning, which validates the key part of digital curriculum and artificial intelligence as the mediator of enhancing the educational and social performance of children.

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Nonetheless, this study is not similar to the earlier researches in their approach and methodology. Although majority of past researches have been theoretical reviews or qualitative research, the current research gives first-hand empirical evidence regarding the influence of AI as a mediating variable on social skills and learning

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