Online Tools for Enhancing the Family's Role in Student Educational Achievement

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Abstract

The use of technology in education has been widely investigated, with a particular focus on remote communication during the COVID-19 pandemic. These settings have prompted a deeper study of the role that families can play in remote learning to support student educational achievement. This study has explored the student–family factors that could influence student educational achievement, building a theoretical framework of those factors and proposing associated online tools. Accordingly, this study used a cross-sectional survey design to explore the opinions and beliefs of parents about those factors and the suggested online tools based on the theoretical framework. The study sample consisted of 1,259 parents who responded to a survey of 10 items related to student–family factors and the suggested associated online tools. The findings indicated that many factors could improve student educational achievement, especially for students from underprivileged families. This study recommends providing online discussion tools to serve as a communication channel between schools and the families of students, supporting synchronous or asynchronous learning platforms, ensuring accessibility for all families who are involved with the school, and facilitating the school's timely engagement with families through the designated online discussion tools.

Keywords: eLearning, distance learning, family role, educational achievement, educational technology, digital tools

1. Introduction

The advent of new technologies and the emergence of the COVID-19 pandemic has forced institutions and families to rethink their communication tools, taking into consideration a world where learning no longer takes place in face-to-face settings and where feasible synchronous technology makes virtual learning and meeting simpler than before. Many questions related to family involvement and students' home environment have been highlighted during the pandemic. These queries are mostly related to student achievement and persistence after the pandemic.

1.1 Factors Influencing Student Achievement

Prior studies have identified specific factors related to families and home environments that have a positive or negative influence on student achievement. These factors are (a) family members living at home with the student, (b) the level of family member education, (c) ethnicity, (d) financial status, (e) home district or city, and (f) family member attitudes toward involvement in the student's education (Sheldon & Turner-Vorbeck, 2019). Those factors were exacerbated by education instruction carried out entirely at home during the pandemic, entirely dependent on virtual learning with little or no preparation (Dong et al., 2020).

Given the importance of deriving lessons from this sudden change in the way education was administered during the pandemic, this study focuses on how those impacts could be used to enhance students' family and home environments for online learning. The study emphasizes ways to exploit available cyber communication methods and to turn previously perceived negative factors into advantages for facilitating student achievement in K-12 education systems, especially for students from underprivileged families in the public education systems.

1.2 Family and Home Environment Factors That Influence Student Educational Achievement

This section focuses on the most prominent factors, concentrating on K-12 education, which then can be used to investigate the influence of family and home environment. This study describes the family as parents and family

members who live with the student and defines the home environment by setting, atmosphere, and area/district. Within these parameters, the section relays the factors in terms of their positive or negative influence on student educational achievement and related skills and knowledge.

(a)   Family Member's Willingness
- The significant factor is the influence of family members' willingness to share information about the student's progression and performance at home with teachers. This relationship mutually benefits teachers, the family, and the student.
- The communication between teacher and family about the knowledge and/or skills that the students need to meet certain requirements, as well as a suggestion to achieve desired outcomes.
- The communication and deliverance regarding the student's progress at home, as well as an understanding of the student's needs to attain anticipated outcomes.

This type of communication is highly valued by Barak & Green (2021), who explain student progress in their elaborated explanation of the family role by utilizing the zone of proximal development (ZPD) proposed by Smolucha & Smolucha (2021), which lends itself to sociocultural theory.

(b)   Concept of micro-meso systems
- The concept of micro-meso systems also contains many family-related factors, drawing attention to two layers of systems, each with its factors (Navarro & Tudge, 2022).
- The first layer is the fundamental and broad layer of factors related to the student's environment and identified by the activities, relationships, culture, rules, and roles that define where the student lives and interacts.
- The second layer is mainly focused on how links between factors in the first layer can be manipulated to positively influence change in a student's environment to benefit educational achievement.

(c)   Process–person context model
- The process–person context model proposed by Coşkun & Katıtaş (2021) appears to agree with Navarro & Tudge (2022), in that the interaction between student environment and personality traits can be associated with positive progress in learning and knowledge acquisition.

It is worth noting that previous concepts and their related factors adopted the ecological system theory approach, focusing more on the role of personal and environmental characteristics in shaping individual learning. Many studies have discussed student family factors related specifically to family capital, as outlined by Okbay et al.'s (2022) theory, which has a great influence on student learning and achievement outcomes.

(d)   Financial Status
- Numerous studies also indicate that factors like family location and financial status can have a considerable influence on student educational achievement (Hill & Tyson, 2009; Ladd & Parke, 2021).

(e)   Social Status
- Wilson & Worsley (2021) reported that the social status and education of a student's family greatly impact the student's ability to build learning strategies and establish purposeful learning friendships with peers.

These actions are considerably influenced by learning or copying the examples of parents or other family members living with the student. Relatedly, Djonko-Moore (2022) highlighted the student's need for a role model who conveys confidence and the ability to acquire new knowledge and skills as another important factor, in addition to a family member's capacity to teach and supervise the student. The attitudes of family members toward engaging in student educational endeavours, as well as the school's receptiveness to family participation, is indicated as a highly valued factor by Gonzalez-DeHass et al. (2022).

1.3 Initiative for Improvement in Educational Environment by Student Family

This section focuses on solutions provided by the literature that is related to the student family factors discussed in the previous section.

Solution 1: One solution proposed by Shumow and Moya (2019) is opening a two-way communication channel, utilized by the student's family and the school, to convey information regarding the student's progress and any challenges to achieving desired outcomes.

This approach adopts the ZPD concept to determine the student's needs promptly, with immediate help administered when progression is stalled based on strategies devised by the school.

Solution 2: Correspondingly, McWayne et al. (2022) devised a more family-oriented approach, with schools developing strategies and activities based on family experience and inherited knowledge.

Both solutions reflect some aspects of ecological system theory and have also been suggested by Navarro & Tudge (2022), departing from his proposed micro-meso systems approach. Navarro & Tudge suggested steady and flexible intervention and collaboration between the student's family and the school, breaking a vicious cycle of negative family factors that influence a student's activities, relationships, and rules by introducing purposeful knowledge and activities to the home environment.

1.4 Impact of Improvement

However, these solutions were driven primarily by the financial income, education, and social status of the student's family.

    i. King et al. (2021) identified remedies that take into account differences in student family income. He proposed that schools provide educational books and other necessary resources. The role of family education and social status in educational achievement also have importance.

    ii. Wilson & Worsley (2021), stated that family income can improve educational achievement by allowing students to enroll in a better school and live in a neighborhood with sufficient services. It is not necessary to mention the difference that is made from funding educational expenditures such as books, supplies, and private lessons. Wilson & Worsley (2021) pointed out that students from uneducated families are unable to take advantage of such privileges, as students from educated families can emulate family members' strategies for learning or making educational decisions.

Some studies investigated these family educational and social status privileges and provided instances where the lack of a family role model or the unavailability of educated family members was alleviated. Studies from Robledo et al. (2022), Luthar et al. (2021), and Simpkins et al. (2020), based on an ethnographic approach, share examples of remedies reported by uneducated families who were able to support educational achievement by enrolling students in social activities that involved successful persons willing to share their knowledge and experience.

1.5 Positive Facilitation of Student Families about Online Tools

Previous studies have indicated that the primary factors for successful online communication between schools and families are simplicity (how many steps are needed to achieve the intended purpose) and ease of access (level of technology required). However, the purpose and accessibility of online tools vary between platforms (Blau & Hameiri, 2017; Xiu & Thompson, 2020).

Accordingly, this study explored the literature on parent and family preferences when using online tools. *(a) Use of Email:* the use of email was parents' most preferred online tool for communicating with the school about important notices and student educational performance because of its convenience, ease of use, and accessibility (Ravi et al., 2021; Xiu & Thompson, 2020).

(b) Use of Websites: Rudi et al. (2015) indicated that parents prefer to use websites to get information about improving their children's educational performance.

(c) Use of Discussion boards: Gao et al. (2012) reported that parents are more likely to use discussion boards to share information and experiences about students' educational challenges and needs, which is also an opportunity to elevate social capital by establishing new relationships with other families who share the same values and interests (Dolan, 2022; Hammersley et al., 2020).

(d) Use of LMS: It should also be mentioned that some studies investigated the role of learning management systems (LMS) in enhancing family–school communications. However, reports from such studies did not recommend the route, indicating a lack of simplicity, accessibly, and designated tools for parental communication (Gu, 2018; Laho, 2019) and the parent's tendency to use their preferred conventional online tools for specific purposes and sought information (Gao et al., 2021). Therefore, this study has excluded LMS as an online tool for family–school communication.

This study aims for providing online discussion tools to serve as a communication channel between schools and the families of students, supporting synchronous or asynchronous learning platforms, ensuring accessibility for all families who are involved with the school, and facilitating the school's timely engagement with families through the designated online discussion tools. From the presented literature, this study has developed an initial framework depicting all aspects related to student family factors that influence student educational achievement as presented in Table 1. This study can contribute to the development of the education system and even provide education and training to Saudi parents whether they are educated or not. The framework provided in this study is the seed of improvement in the base of the Saudi education system. (see Table 1)**:**

Table 1. A literature review of aspects that influence student family factors and predicted solutions

Student family factor	Underpinning theory	The solution from the literature	Recommended online tools
School–parent communication: • Two-way communication • Transmission of knowledge and skills • Development monitoring • Strategic participation	Sociocultural theory (zone of proximal development)	• Investment in tools enhancing two-way communication • Mutual benefit between parents and schools to help students achieve desired outcomes	• Email • Forums/discussion boards
Barak & Green, 2021	Smolucha & Smolucha, 2021	McWayne et al., 2022; Shumow & Moya, 2019;	Dolan, 2022; Gao et al., 2021; Hammersley et al., 2020; Ravi et al., 2021
Student environment: • Micro factors: activities, relationships, culture, rules, and roles • Meso factors: school influence on motivating positive change in micro factors	Ecological system theory	• Introduction of purposeful knowledge and activities to the home environment	• Websites • Email
Coşkun & Katıtaş, 2021; Navarro & Tudge, 2022	Navarro & Tudge, 2022	Navarro & Tudge, 2022	Ravi et al., 2021; Rudi et al., 2015
Family capital: • Financial capital • Social capital • Human capital • Cultural capital	Family Capital Theory	• Provision of educational books and other necessary resources • Social activities promoting the involvement of influential persons	• Forums/discussion boards • Email • Websites
Djonko-Moore, 2022; Hill & Tyson, 2009; Gonzalez-DeHass et al., 2022; Ladd & Parke, 2021; Okbay et al., 2022;	Okbay et al., 2022	King et al., 2021; Luthar et al., 2021; Robledo et al., 2022; Simpkins et al., 2020; Wilson & Worsley, 2021;	Dolan, 2022; Gao et al., 2021; Hammersley et al., 2020; Ravi et al., 2021; Rudi et al., 2015

2. Methodology

2.1 Study Design

This research focused on parents as the unit of analysis since their perspective was vital to the study's objectives. The parents lived in five different public school districts in five different regions of Saudi Arabia (south, north, west, east, and middle).

2.2 Sample Size

The sample target population included approximately 5,000 participants, based on 2020 data obtained from the Ministry of Education. Voluntary participation was sought by the Ministry of Education, with the final sample consisting of 1,259 parents, an acceptable sample size for the study questionnaire, according to Harrison et al. (2020). The response rate was 25.18% which falls into the acceptable range of 20–60% suggested by Holtom et al. (2022). Response bias was assessed every week by checking the response change rate using an average and median of the responses (Harrison et al., 2020); no significant change was detected.

2.3 Study Tool

The study employed a cross-sectional survey design to explore participant opinions and beliefs to test the

theoretical framework suggesting solutions for improving student educational achievement through family support with associated online tools. The study used a web-based questionnaire consisting of four demographic questions and 20 close-ended questions with linked open-ended questions.

To ensure validity and reliability, many steps suggested by Harrison et al. (2012) were implemented, such as piloting the questionnaire with 50 participants who shared the same characteristics as the target sample. Test–retest reliability was examined by administering the questionnaire to the pilot sample twice, with an interval of two weeks (Polit, 2014). Spearman's rho assessment of the test-retest results indicated a strong correlation between the questionnaire items [.81–.92], indicating good to excellent reliability/stability (Portney & Watkins, 2009).

2.4 Reliability and Validity

To ensure content validity, the questionnaire items were reviewed by five experts, two in the educational technology field and three in psychology, and all of their recommendations were accepted. Moreover, the validity of the questionnaire structure was assessed by initially comparing the piloting results with the theoretical framework, which indicated agreement with 80% of the expected results. Clarity and completion feasibility was assessed based on feedback from the pilot participants and time spent completing the questionnaire, resulting in the refinement of two questionnaire items and an estimated completion time of 4 to 7 minutes.

2.5 Statistical Analysis

The results for close-ended questions were analyzed quantitatively using the IBM SPSS Statistics application (IBM SPSS Statistics, 2020). The chi-square test was used to determine the significance of the difference between observed and expected response results, and Pearson chi-square crosstabs were used to determine the significance of the relationships between the respondents' main characteristics (education, region, revenue, and internet access). The open-ended questions were analyzed using quantitative content analysis to categorize responses into quantifiable themes (Neuendorf, 2017).

3. Results

The study results were consistent with the literature in many aspects influencing student family factors; some participant demographics appeared to have a direct association with the reported responses. Table 2 shows the main characteristics of the participants by percentage.

Table 2. The main characteristics of the participants by percentage

Education level	Above secondary	Secondary	Elementary	Primary	No education
	62%	**25%**	**6%**	**6%**	**1%**
Internet access	No access	Low access	Full access		
	1%	**38%**	**61%**		
Location	Rural area	Suburban area	City		
	16%	**40%**	**44%**		
Family revenue	More than 10K	10K or less			
	43%	**57%**			

Most participants—62% of the sample—had a university-level education, while 25% had a secondary-level education. Parents with an elementary- or primary level of education constituted 12% of participants, and a minority—just 1%—had received no education. At 61%, the majority of parents had full access to the internet. Parents reporting low internet access dropped this number to 38%, and only 1% had no internet access. A relatively even percentage of participants lived in cities (44%) and suburban areas (40%), with just 16% living in rural areas. Finally, 57% of participants reported monthly earnings of less than 10,000 Saudi ryals (SR), with 43% earning 10,000 SR or more.

Overall, the responses to the questionnaire confirmed the proposed theoretical framework regarding the family's role in supporting student educational achievement in most aspects, although there were significant differences between several observed and expected responses. Table 3 shows the percentages and significance of the responses and associated quantified comments (if applicable).

Table 3. Percentages and chi-square significance of the responses and associated quantified comments

Main questionnaire items								Proposed online tools if main questionnaire items answered with "yes"						
No	Item	Yes	IDK	No	Reason/s if "no" (count)	Sig	X²(2)	Email	DF	WEB	Other	Suggested method, if other	Sig	X²(3)
1	The family's communication with the school remotely contributes to the family's ability to follow the student's level of achievement.	87%	9%	4%	Parents' lack of education **(10 comments)** Parents' lack of digital literacy **(3 comments)** Time constraints **(3 comments)** NA **(12 comments)**	.000	1655.86	24%	47%	10%	19%	WhatsApp/WhatsApp groups **(87 comments)** Telegram **(40 comments)** LMS **(2 comments)** NA **(9 comments)**	.000	405.38
2	The family's communication with the school remotely contributes to the family's ability to identify the needs of the student to improve academic achievement.	82%	13%	5%	Lack of school responsiveness **(12 comments)** High teacher dependency on remote communication **(7 comments)** NA **(15 comments)**	.000	1379.81	25%	46%	11%	18%	WhatsApp/WhatsApp groups **(61 comments)** Telegram **(36 comments)** LMS **(12 comments)** NA **(8 comments)**	.000	376.40
3	The family's communication with the school remotely contributes to the family's ability to identify the methods and strategies proposed by	79%	14%	7%	Internet cost **(15 comments)** Multiplicity of platforms **(13 comments)** Lack of school responsiveness **(10 comments** NA **(18**	.000	1431.74	26%	45%	13%	16%	WhatsApp/WhatsApp groups **(78 comments)** Telegram **(23 comments)** LMS **(10 comments)** NA **(10 comments)**	.000	397.78

	the school to improve the student's academic achievement.				comments)									
4	The family's communication with the school remotely enables the family to propose solutions to improve the student's academic achievement.	79%	15%	6%	Families' proposals are not welcomed **(19 comments)** Lack of school responsiveness **(6 comments** NA **(20 comments)**	.00 0	1307.08	25%	45%	13%	17%	WhatsApp/Whats App groups **(79 comments)** Telegram **(50 comments)** NA **(17 comments)**	.00 0	367.35
5	Enabling the family to communicate remotely with the school and other families in the school changes or improves some ideas or convictions that prevail within the family to support the student's academic achievement	78%	17%	5%	Inappropriate ideas, convections, and activities might negatively affect families **(11 comments)** NA **(22 comments)**	.00 0	1240.90	27%	44%	13%	16%	WhatsApp/Whats App groups **(112 comments)** Telegram **(35 comments)** NA **(8 comments)**	.00 0	420.36
6	Enabling the family to communicate remotely with the school and other families in the school changes or improves	77%	18%	5%	Inappropriate ideas, convections, and activities might negatively affect families **(10 comments)** NA	.00 0	1097.15	28%	44%	13%	15%	WhatsApp groups **(110 comments)** Telegram **(33 comments)** NA **(19 comments)**	.00 0	402.79

	some activities and interactions within the family to support the student's academic achievement.				(21 comments)									
7	Enabling the family to communicate remotely with the school and other families in the school improves communication by facilitating connections between families of different social statuses that would otherwise be difficult to enable without remote communication tools.	70%	23%	7%	Provokes cultural and status challenges and disagreements **(19 comments)** Not an appropriate avenue for building families connections **(2 comments)** NA **(23 comments)**	.00	815.68	26%	40%	21%	13%	WhatsApp groups **(111 comments)** Telegram **(29 comments)** NA **(18 comments)**	.00	392.35
8	The remote availability of reference materials, books, and additional educational resources helps ease the material challenges that some families have supporting student academic	78%	16%	6%	Internet cost **(19 comments)** Lack of school responsiveness **(12 comments)** NA **(15 comments)**	.00	1176.46	25%	41%	21%	13%	WhatsApp groups **(56 comments)** LMS **(35 comments)** Telegram **(31 comments)** NA **(19 comments)**	.00	227.92

							Sig	X2						Sig	X2
	achievement.														
9	Enabling the family to communicate remotely with the school and other families in the school improves individual family member capabilities by collaborating in a remote communication platform.	70%	23%	7%	Provokes cultural and family status challenges and disagreements **(17 comments)** NA **(22 comments)**		.00 0	838.9 7	27%	44%	15%	14%	WhatsApp groups **(113 comments)** Telegram **(28 comments)** NA **(12 comments)**	.00 0	407. 78
10	Enabling the family to communicate remotely with the school and other families in the school improves the family's educational culture by providing a connection to environments with a strong educational culture.	70%	23%	7%	Provokes cultural and family status challenges and disagreements **(19 comments)** NA **(25 comments)**		.00 0	851.8 3	26%	45%	15%	14%	WhatsApp groups **(112 comments)** Telegram **(33 comments)** NA **(11 comments)**	.00 0	445. 05

Table key: IDK = I don't know; **DF** = Discussion forum; **Sig** = Significance; **NA** = Not applicable; **WEB** = Website; **LMS =** Learning management system; **X2** = chi-square test value; **X2 (**degree of freedom**)**

The results significantly confirm the study's suggested statements about the role remote communication between schools and families can play in promoting students' educational achievement, including facilitating student progress monitoring and attending to educational needs. Parents significantly agreed that remote communication with the school enables families to monitor and identify the needs of their student's family members to improve academic achievement. Although disagreement with the suggestions was not significant, it is worth mentioning that some of the aggregated reasons for disagreement could add to the literature and further efforts to improve

school–family communication. These reasons were primarily concerned about the five aspects (based on the number of comments from high to low—see details in Table 3): lack of school responsiveness, parents' lack of education, time constraints, and parents' lack of digital literacy. In this regard, parents concede that online discussion forums have been ideal spin for delivering student progress supervision and responding to student needs. However, other online tools suggested by parents were WhatsApp/WhatsApp groups, which were first based on responses, followed by Telegram and LMS (see Table 3 for more details).

Additionally, significant responses affirm that remote communication gives parents a chance to propose solutions to the school, and vice versa, to promote student academic achievement. Notwithstanding, some parents did not see this as an opportunity of any great importance. The main reasons given for this disagreement included claims that family proposals were not welcomed, a lack of school responsiveness, internet costs, and platform multiplicity (based on the number of responses from high to low—see details in Table 3). Furthermore, online tools for two-way communication between schools and families known as discussion forums have been considered predominant, and significant. Other suggested online tools included WhatsApp/WhatsApp groups, followed by Telegram and LMS.

Significant confirmation of the study's theoretical suggestions extended to the involvement of other families in the same school in the proposed remote communications channel. Parents agreed that this channel enables positive change in ideas, activities, social status, individual capabilities, and family educational culture. The results also highlighted the importance of presenting online reference materials, books, and additional educational resources for all students. Although not as significant, parents who dissent from the suggested communication channel shared a critical reason. Those parents expressed concern that the channel might provoke cultural and status disagreements. They also raised concerns related to internet costs and the lack of school responsiveness. Only two responses viewed the channel as inappropriate for building family connections. There was significant support for discussion forums as the ideal online tool for the proposed channel between schools and families in the same school, with WhatsApp/WhatsApp groups also suggested, followed by Telegram and LMS.

The study endeavoured to ascertain the likelihood that parental demographics could influence their responses. Pearson chi-square crosstabs were used to determine the significance of the relationships between respondents' main characteristics (see Table 4).

Table 4. Pearson chi-square crosstab associations

	Items	1	2	3	4	5	6	7	8	9	10
Education	**Edu (choice)**	5 (3)	-	-	4 (3)	-	-	-	1 (3)	-	-
	Sig	.003	.343	.784	.007	.215	.131	.834	.022	.390	.321
	X²	23.182	-	-	21.021	-	-	-	17.879	-	-
	Edu (methods)	-	4(2)	4(2)	4(2)	4(2)	5(2)	4(2)	4(2)	5(2)	-
	Sig	.326	.006	.030	.020	.007	.000	.002	.018	.000	.153
	X²	-	27.589	22.766	23.988	27.342	36.713	31.530	24.402	35.814	-
Revenue	**Rev (choice)**	2(3)	2(3)	-	2(3)	2(3)	2(3)	-	2(3)	2(3)	-
	Sig	.002	.001	.151	.005	.015	.001	.192	.027	.047	.050
	X²	12.655	13.135	-	10.616	8.412	14.239	-	7.218	6.124	-
	Rev (methods)	-	-	-	-	2(2)	-	-	2(2)	-	-
	Sig	.977	.938	.687	.280	.034	.114	.151	.001	.134	.139
	X²	-	-	-	-	8.647	-	-	16.723	-	-
Location	**Loc (choice)**	-	-	-	-	-	-	-	-	-	-
	Sig	.970	.726	.328	.591	.506	.685	.893	.783	.804	.412
	X²	-	-	-	-	-	-	-	-	-	-
	Loc (methods)	-	-	-	-	-	-	-	-	-	-
	Sig	.137	.783	.218	.284	.118	.495	.075	.389	.388	.334
	X²	-	-	-	-	-	-	-	-	-	-
Internet access	**Loc (choice)**	3(3)	3(3)	-	-	3(3)	3(3)	-	3(3)	3(3)	-
	Sig	.001	.000	.260	-.077	.000	.012	.135	.005	.044	.151
	X²	19.235	25.492	-	-	24.451	12.893	-	15.090	9.820	-
	Loc (methods)	-	-	-	2(2)	-	-	-	2(2)	-	-
	Sig	.304	.193	.075	.031	.120	.131	.059	.021	.137	.067
	X²	-	-	-	13.850	-	-	-	14.882	-	-

Table key: Sig = Significant association; **Edu** = Education level; **Loc** = Location**; Int** = Internet access; **Rev** = Revenue; **choice** = Associated response regarding an agreement with the questionnaire statements; **methods** = Associated response regarding the suggested online tools (only if the response is ―yes"); **X²** = Pearson chi-square value

Regarding the association between parents' education and agreement with the study's suggested statements, the study found that parents with a university-level education tended to significantly agree that remote communication with the school enables the family to follow student achievement levels X^2 (8, N = 1259) = 23.182, p < .05. Parents with a secondary-level education were significantly more likely to agree that remote communication with the school enables the family to propose solutions to improve student academic achievement X^2 (8, N = 1259) = 21.021, p < .05. Parents without any formal education tended to significantly agree that the online availability of reference materials, books, and additional educational resources contributes to easing the material challenges that some families have provided support for student academic achievement X^2 (8, N = 1259) = 17.879, p < .05.

When education level is associated with the ideal online tool, parents with a secondary-level education were significantly more likely to choose the discussion forum to identify student needs and to improve academic achievement X^2 (12, N = 1259) = 27.589, p < .05; to identify the methods and strategies proposed by the school to improve student academic achievement X^2 (12, N = 1259) = 22.766, p < .05; to propose solutions to improve student academic achievement X^2 (12, N = 1259) = 23.988, p < .05; to communicate remotely with the school and other families in the school to change or improve prevailing ideas and convictions within the family that support student academic achievement X^2 (12, N = 1259) = 27.342, p < .05; to communicate remotely with the school and other families in the school, thereby improving communication between families of differing social statuses that would be difficult without remote communication tools X^2 (12, N = 1259) = 31.530, p < .05; and to facilitate remote access to reference materials, books, and additional educational resources X^2 (12, N = 1259) = 24.402, p < .05. On the other hand, these parents were also significantly more likely to choose the discussion forum to enable remote communication that changes or improves activities and interactions within the family that support student academic achievement X^2 (12, N = 1259) = 36.713, p < .05, and to improve individual family member capabilities by connecting with families that have stronger educational abilities and skills X^2 (12, N = 1259) = 35.814, p < .05.

The association test between parental income and agreement with the study's suggested statements revealed that parents with an income above 10,000 Saudi riyals tend to significantly agree that remote communication enables the family to follow student achievement levels X^2 (2, N = 1259) = 12.655, p < .05; to identify student needs to improve academic achievement X^2 (2, N = 1259) = 13.135, p < .05; to propose solutions to improve student academic achievement X^2 (2, N = 1259) = 10.616, p < .05; to adopt changes and improvements to ideas and convictions within the family that support student academic achievement X^2 (2, N = 1259) = 8.412, p < .05; to adopt changes or improvements to activities and interactions within the family that support student academic achievement X^2 (2, N = 1259) = 14.239, p < .05; to facilitate the remote availability of reference materials, books, and additional educational resources X^2 (2, N = 1259) = 7.218, p < .05; and to improve individual family member capabilities by connecting with families that have strong educational abilities and skills X2 (2, N = 1259) = 6.124, p < .05.

Parents with an income above 10,000 Saudi riyals are significantly more likely to choose the discussion forum to communicate remotely about changes and improvements to ideas and convictions within the family that support student academic achievement X^2 (3, N = 1259) = 8.647, p < .05 and to facilitate remote access to reference materials, books, and additional educational resources X^2 (3, N = 1259) = 16.723, p < .05.

In addition, the study results showed an association between internet accessibility and agreement with the questionnaire statements. Parents with full internet access were more likely to agree that remote communication enables the family to follow student achievement levels X^2 (4, N = 1259) = 19.235, p < .05; to identify student needs to improve academic achievement X^2 (4, N = 1259) = 25.492, p < .05; to change and improve ideas and convictions within the family that support student academic achievement X^2 (4, N = 1259) = 24.451, p < .05; to change or improve activities and interactions within the family that support student academic achievement X^2 (4, N = 1259) = 12.893, p < .05; to facilitate the remote availability of reference materials, books, and additional educational resources X^2 (4, N = 1259) = 15.090, p < .05; and to improve individual family capabilities by connecting with families that have strong educational abilities and skills X^2 (4, N = 1259) = 9.820, p < .05.

Parents with poor internet access significantly chose the discussion forum for remote communication with the school, enabling the family to propose solutions to improve student academic achievement X^2 (6, N = 1259) = 13.850, p < .05 and to facilitate remote access to reference materials, books, and additional educational resources X^2 (6, N = 1259) = 14.882. No association was found between location and any of the study items.

4. Discussion

This study found that remote communication between schools and students' families has been considered by

parents as an important factor. This allows families to monitor student progress and identify needs to meet desired educational outcomes. These results are underscored by Barak & Green (2021) sociocultural theory, explaining family utilization of the ZPD, and agree with Shumow and Moya (2019) on the positive impact of communication between schools and students' families. The findings also confirmed McWayne et al. (2022) suggestion that a two-way communication channel between students' families and schools improves the strategies and methods for enhancing student educational achievement by allowing the exchange of ideas and information.

This stems from Navarro & Tudge (2022) recommendations for a steady and flexible intervention and collaboration between families and schools. The findings indicated that parents positively perceive remote communication with the school and other families in the school to improve student educational achievement, alleviating the income, education, and social status gaps denoted by many studies (Hill & Tyson, 2009; Ladd & Parke, 2021) as influencing student educational achievement. Parents believe that a remote communication channel can support their social status, change and improve activities and convictions within the family, improve the capabilities of individual family members, and improve the family's educational culture, which agrees with the findings of Robledo et al. (2022), Luthar et al. (2021), and Simpkins et al. (2020). These beliefs are important to student educational development and achievement, which were pinpointed by King et al. (2021) and Wilson & Worsley (2021). As identified by King et al. (2021), the study found that parents view the school's ability to offer remote access to reference materials, books, and additional educational resources as an important asset for student educational improvement.

Although the study confirmed the student family factors suggested by the theoretical framework, the education level, income, and level of internet access of the parents were all factors that influenced their choices. Parents with a higher level of education, income, and internet access were more likely to accept that remote communication is better overall for students' educational achievement. However, parents with no formal education tend to focus on the remote availability of educational resources and materials, which conforms to Cameron et al.'s (2022) study of families with different family capital.

Given this study's objectives to confirm the theoretical roots of the student–family factors that can improve student educational achievement, along with determining the ideal online tool that can serve this purpose for families, the findings point to the discussion forum as the ideal remote communication option. This tool has been selected by parents for all of the suggested solutions for better student educational achievement, followed by the WhatsApp application, which resembles discussion forums on mobile devices.

These study items have been insisting on enhancing overall family educational culture, so the choice of the discussion forum was not new, since it conforms with many studies (Blau and Hameiri, 2017; Hammersley et al., 2020; Dolan, 2022; Xiu & Thompson, 2020) suggested that families of all types tend to opt for choices that offer easy two-way communication synchronously or asynchronously, with all information and resources available for all participants/parents in one platform. This approach also conforms with Dolan (2022) and Hammersley et al. (2020) findings of the discussion forum as the ideal choice for parents when it comes to enhancing student achievement by facilitating discussions of student educational challenges and needs. This also seems to be a chance for parents to elevate their social capital by establishing new relationships with other families who have similar values and interests.

However, these findings do not agree with Ravi et al. (2021), who suggested that email is the ideal online tool for communication, or Xiu & Thompson (2020) and Rudi et al. (2015), who posited websites as the better choice. One possible reason for the popularity of discussion forums is that files can now be uploaded and downloaded from those platforms, whether on mobile devices or web browsers, making them more accessible compared to websites or emails. Another reason is that the study did not address issues related to privacy or individual students and the sense of a collective effort was presumed, as in the studies by Liyanage (2023) and Hammersley et al. (2020).

5. Conclusion

The role of family members in K-12 students' educational achievement could significantly change in the future if more efforts are made to keep them engaged by utilizing the appropriate tools that they perceive as meaningful and useful. The parents in this study saw discussion boards as the ideal online tool, offering opportunities for meaningful and constructive dialogue that leads to better educational outcomes, culture, and society. With this in mind, the recommendation to provide online discussion tools as a communication channel between schools and students' families, whether synchronous or asynchronous, is validated by the findings of this study.

Facilitating this online dialogue should ensure accessibility for all families involved in the school, using the

technological tools necessary to ensure such a guarantee. The study's recommendation for the timely engagement of schools with families was one of the main concerns expressed by parents who participated in the study. Moreover, schools should maintain a healthy and constructive environment that takes into account differences in family backgrounds, educational cultures, and financial and societal status. Relatedly, online/offline dialogue tools should not be devoid of books, reference materials, or other educational resources that contribute to better outcomes for students from underprivileged families.

Future studies could examine the reasons why some families are unwilling to engage in dialogue with other families in the same school, as some parents reported that remote communication is an inappropriate avenue for building connections with other families. In addition, researchers could empirically investigate the impact of having an available, open, and active online discussion board compared to traditional communications channels between schools and families, whether through experimental design studies or action research, as a tool for change. More interesting studies could use a longitudinal time horizon to see how online dialogue availability between schools and families affects the life of a group of family members or a cohort of students.

Ethics statement

Studies involving human participants were reviewed and approved by the Department of Educational Technology at the College of Graduate Educational Studies at King Abdulaziz University.

Consent statement

Informed consent was provided by the participants and all procedures were approved by the Department of Educational Technology at the College of Graduate Educational Studies at King Abdulaziz University.

Conflict of interest

The author declares that this research was conducted without any commercial or financial relationships that could be construed as potential conflicts of interest.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the author, without undue reservation, after approval, is granted from the Saudi Ministry of Education.

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