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Educational Smartphone App Usage: Effect on Students Learning Achievements at University Level

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Abstract

The current study intends to investigate the "Educational Smartphone App Usage: Effect on Students Learning Achievement at University Level". The study's objectives are to assess the impact of educational smartphone app integration on students' academic development, to observe how mobile technology supports academic activities at the university level, to identify challenges that students face when using educational apps, and to propose practical strategies for improving mobile learning environments. The study also looks into how demographic variables including gender, academic program, and previous digital learning experience influence perceptions of smartphone technology's usefulness. The study's demographic consisted of university students from Multan's higher education institutions. A simple random sampling technique were applied, and 312 students who frequently used instructional smartphone applications were randomly chosen. Data were collected using a standardized questionnaire. Data were examined with SPSS version 25, which included statistical procedures for example Frequency, Mean, Standard Deviation, Independent Sample T-Test, One Way ANOVA, and Pearson Correlation. The study found that instructional smartphone apps greatly improved students' academic performance, digital competences, and learning autonomy. Students were able to connect more deeply with academic topics, and they demonstrated better time management and self-directed learning skills. However, other students cited difficulties, such as a lack of access to high-quality apps, insufficient institutional support, and network or device restrictions. Statistical results revealed no significant difference in perceptions between male and female students across most variables, although personal access to digital resources and prior tech exposure varied significantly depending on program and academic background. Based on these findings, the report suggests that universities offer focused faculty training, construct digital support systems, and establish an online portal to consolidate app-based resources and user help. Furthermore, universities should enable equitable access to technology and encourage the inclusion of apps that correspond with instructional objectives.

Keywords: Smartphone Usage, Students Academic Performance, Faculty Training.

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Introduction

1.1: Role of Educational Apps in Modern Learning:

Applications for smartphones that are intended to supplement academic activities and improve learning experiences are known as educational apps. Access to digital textbooks, interactive learning modules, time management tools, collaboration platforms, and resources .for scholarly research are just a few of the many features that these apps offer. These applications seek to give students mobile access to educational resources and instruments that can supplement conventional teaching techniques by making use of the capabilities of contemporary smartphones. Information and communication technology (ICT) and internet services have significantly changed almost every side of human life. Today's methods of teaching and learning make this quite clear. Nowadays, practically everyone has a smartphone. "This new and exciting technology has been contained by society all over the creation as one of the most vital requirements in their regular lives," state Fawareh & Jusoh (2023). Education around the world has been significantly impacted by the widespread use of cellphones and associated devices, both in developed and developing nations.

1.2: Smartphones in Education:

According to Technorati (2019), "a smartphone is a mobile phone with extremely progressive structures," High-resolution touch screen, Wi-Fi, web browsing, and the ability to run sophisticated apps are all elements of a typical smartphone. In order to accomplish their academic research and teaching goals, students might use smartphones, which are smart devices, to swiftly access information (Ebiye, 2015). Traditional learning is the first stage of the educational process, requiring students to attend classrooms. On the other hand, books and videos were employed to enable students to study overseas through distance learning. Afterwards, computers were included into educational strategies, and learning materials were delivered online (Bayan Abu Shawar, 2017).

1.3: M-Learning:

M-learning is the term for the more contemporary learning management systems (LMS) environment of e-learning that is accessed utilizing wireless devices (such as iPads, Apple iPods, mobile phones, smart phones, etc.). These devices' apps are integrated with 4G, 5G, and Wi-Fi telecommunication networks, which primarily rely on the use of wireless technologies. This means that students can access educational materials such as lectures, homework, and quizzes, as well as work together and support fieldwork activities without being constrained by time or place. (UNESCO, P According to Buchholz, Perry, Weiss, and Cooley (2016), mobile devices facilitate peer collaboration among students by providing them with email, online chat, blogging, and social media platforms. These tools enable students to advance their programs by earning credits. As a novel model, m-learning encourages flexibility, allowing students to participate in learning ways without being limited by age or skill level. (Boyle, A. M. and L. F. O'Sullivan; 2016).

1.4: Purpose of the Study:

The study's main objectives are to: (1) determine the attitudes of some students towards the acceptability of mobile methods; (2) evaluate the quality of mobile services for social and educational purposes in order to improve learning in higher education institutions; and (3) determine the level of technological literacy of some students (Heflin, H., Shewmaker, J., & Nguyen, J. 2017).

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1.5: Mobile Devices in Higher Education:

According to a 2012 review on mobile IT in higher education by the Educause Centre for Applied Research [ECAR], students are pushing the adoption of mobile computing devices in higher education, such as smartphones, tablets, and telephones. Sixty-seven percent of the students surveyed said they use and believe that mobile devices are essential to their academic success. The growing prevalence of mobile computing devices on college campuses may open up new opportunities for students pursuing higher education as well as encourage the investigation of social media and mobility as teaching strategies.

1.6: Mobile Learning Accessibility:

With mobile computing devices, students can connect with teachers and classmates and access course materials from any location in the world (Cavus et al., 2023, Kukulska-Hulme, 2021, Nihalani & Robinson, 2022, Shih et al., 2021). Mobile devices along with social media, free online resources that encourage communication and improve learning, make these easy interactions even more accessible (Rodriguez, 2021).

1.7: Research Gaps in Mobile Learning:

Research has tended to concentrate on assessing the efficacy of deploying mobile computing devices because these devices and social media are still relatively new and developing (Wu et al., 2023). Survey methodologies were employed in some of the most rigorous studies to represent students' intentions (Cheon et al., 2024, Liu et al., 2025). There is, however, a dearth of practical study on the real-world use of these tools to enhance teaching and learning, with few accounts of university students' use of social media and mobile computing devices.

1.8: Exploring Mobile Devices in Higher Education:

The purpose of this study were to examine the effects of mobile computing device integration on teaching and learning in higher education. Higher education institutions face both opportunities and challenges from mobile computing devices as their presence in the higher education environment grows (Kim et al., 2025, Looi et al., 2023). Our larger study aimed to provide detailed viewpoints from educators and learners regarding their experiences using mobile computing devices. This study, however, will solely address the experiences and perspectives of students regarding the contributions that mobile computing devices and social media made to their education.

2. Statement of the Problem:

Although teachers and students at universities stand to gain from instructional smartphone apps, their true significance and efficacy remain unclear. Effective integration of these techniques is frequently hampered by problems at universities with funding, personnel, and technology support, among other concerns. Comprehensive study evaluating the impact of mobile apps on learning outcomes, engagement, and the academic atmosphere is lacking. By offering a thorough examination of the resources, integration, and efficacy of instructional smartphone apps at the university level, this study seeks to close this gap. The researcher selected this issue because its burning issue of this time and its very much need to study about it. The issue that has to be addressed in the present study is as follows:

“Educational Smartphone App Usage: Effect on Students Learning Achievement at University Level".

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3. The Rationale of the Study:

The need for evidence-based insights into the efficacy of educational smartphone apps and the growing reliance on technology in education are the driving forces behind this project. Universities may improve instructional techniques, allocate resources more efficiently, and integrate these apps into courses by having a clear understanding of their effects. The study intends to make a significant contribution to the field of educational technology by analyzing the benefits and drawbacks of various technological instruments.

One of the biggest trends in the constantly changing world of higher education is the use of smartphone applications into the classroom. As technology develops, educational institutions use smartphone applications more and more to improve student participation, expedite administrative procedures, and improve learning experiences. The increasing use of digital technologies in academics and the necessity to evaluate their effects on learning outcomes serve as the foundation for this study's reasoning. There is still a knowledge vacuum about smartphone apps' overall efficacy and real-world applications in academic settings, despite the fact that they may provide advantages like easier access to educational resources and interactive learning opportunities. By investigating how these technological resources are incorporated into university courses, this study aims to close this gap.

4. Objectives of the Study:

The study's aims were as follows:

- To examine the impact of educational smartphone apps on student academic performance at university level.
- To identify best practices for the effective integration of educational smartphone apps within university settings.

5. Research Questions:

- What is the impact of educational smartphone apps on student learning outcomes and academic performance?
- What resources are necessary for the effective integration of educational apps into university curricula?

6. Significance of the Study:

Numerous parties involved in the education sector should find this study to be noteworthy. It will give academic institutions understanding of the real-world effects of smartphone app usage, supporting policy and decision-making procedures. It will provide evidence to educators on how these tools may be utilized to improve teaching and learning. The study will demonstrate how educational applications can help students succeed academically and stay engaged in their studies. In the end, the results will help to enhance how technology is incorporated into higher education.

7. Delimitations:

Due to lack of time and constraints resources this research survey were delimited to only:

- The survey were limited to university students in Multan, with no other locations or educational levels included.
- Only four universities were chosen, and they may not represent all higher education institutions.
- The emphasis were on educational smartphone apps, rather than other types of educational technology (such as laptops, tablets, or desktops).
- Data were gathered using a standardized questionnaire that limited replies to predetermined items.

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8. Research Methodology:

The study's research methodology include research design, study location, population, sample size, sampling method, investigation tools, pre-test data collection techniques, and data analysis tools.

The study's major goal is to investigate the impact of smartphone usage on student academic achievement at the university level.

9. Research Design:

In conducting the research, a quantitative research design were employed to systematically investigate the specified variables and relationship within the study. In research design investigate and explain the existing situation regarding the phenomenon. This involved the use of structured surveys and questionnaires, which were administered to participants across various universities.

10. Study Area:

The study were conducted in several universities including The Woman University, Emerson University Multan. Bahauddin Zakariya University Multan, Government Collage University Lahore. These universities were selected to provide a diverse representation of the effect by use of educational smart phone apps by the student achievements and resources of technology used in education institutions.

11. Population and Sample:

The study were carried out in Multan. A total 312 participants were included in the sample. The random sampling techniques were used in which four universities; The Woman university, Emerson University Multan. Bahauddin Zakariya University Multan, Government Collage University Lahore. were selected. The sample size were determined to achieve statistical significance and representativeness, allowing for the generalization of findings to the broader population of students.

12. Research Instrument:

For the purpose of gather data carefully designed survey instrument were utilized. A questionnaire comprised a set of structured questions aligned with the identified variables. Aside from the respondents' demographic information, the questionnaire included several parts to ensure the relationship between the study's various elements.

13. Pre- testing of Research Tools:

13.1: Validity of Study tool:

The instrument were validated by an expert from The Woman University Multan's Department of Education. The questionnaire were then improved based on the expert's recommendations.

13.2: Reliability of study tool:

The survey were pre-tested within the study area. Cronbach Alpha were used to compute the tool's dependability coefficient.

14. Data Collection:

The survey were administered to the selected sample 312 participants across the identified universities. Respondents were also assured of the confidentiality of their data. With proper authorization, eligible respondents were contacted and interviewed at their institutions using a standardized questionnaire.

15. Data Analysis:

Following the data collection phase, quantitative data underwent through analysis. The Statistical Package for Social Sciences (SPSS) is utilized for data analysis. General data

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description were done using both descriptive and inferential statistics. ANOVA (analysis of variance) is also used to compute the components. The correlation test were used to guarantee the relationship between several components or objectives.

Table No. 1

Objective 1: To examine the impact of educational smartphone apps on student academic performance at university level.

T-Test about educational smartphone apps based on Know smart apps?

Factor	Variable	N	Mean	SD	Df	t	Sig. (2 tailed)
Educational Smartphone Apps	Yes	300	108.15	10.253	306	5.217	.000
	No	8	86.75	32.257			

This table displays the results of an independent samples t-test that were used to compare the mean scores of individuals who answered "Yes" and "No". The results indicated a significant difference, t (306) = 5.217, p =.000. Participants who replied "Yes" ensured a mean score of 108.15 (SD = 10.253), but those who answered "No" required a mean score of 86.75 (SD= 35.257), indicating that this explanation had a considerable influence on the variable being examined.

Table No. 2

T-Test about educational smartphone apps based on Mobile phone

Factor	Variables	N	Mean	SD	Df	t	Sig.(2 tailed)
Educational Smartphone Apps	Yes	309	107.78	11.898	309	-.524	.600
	No	2	112.00	.000			

This table shows the results of an independent samples t-test that were designed to mirror the mean scores of the Yes and No groups. The results indicated no significant difference between the two groups (t= -.524, p =.600). The mean score for the Yes group were 107.58 (SD = 11.898), while for the No group it were 112.00 (SD =.000). Thus, the variable in question had no statistically significant effect on the mean scores.

Table No. 3

T-Test about educational smartphone apps based on Student portals help?

Factor	Variables	N	Mean	SD	df	t	Sig. (2-tailed)
Educational Smartphone Apps	Yes	271	108.46	10.246	310	3.175	.002
	No	41	102.24	18.737			

This table displays the results of an independent samples t-test that were used to compare the mean scores of the "Yes" and "No" groups. The results indicated a significant difference between the groups (t = 3.175, p =.002). The mean score for the "Yes" group were 108.46 (SD = 10.246), whereas the mean for the "No" group were 102.24 (SD = 18.737). This indicates that those in the "Yes" group had significantly higher scores than those in the "No" group.

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Table No. 4

Objective 3: To identify best practices for the effective integration of educational smartphone apps within university settings.

T-Test about effective integration of educational smartphone apps based on Know smart apps?

Factor	Variables	N	Mean	SD	df	t	Sig. (2 tailed)
Effective integration of educational smartphone apps	Yes	300	58.23	6.676	306	3.704	.000
	No	8	48.88	16.453			

This table illuminate the outcomes of an independent t-test were lead to compare students who answered "Yes" (N = 300) had a significantly higher mean score (M = 58.23, SD = 6.676) compared to those who answered "No" (N = 8, M = 48.88, SD = 16.453). The independent t-test result were statistically significant, t = 3.704, p < .001, indicating a significant difference in OB3 scores based on the response.

Table No. 5

T-Test about effective integration of educational smartphone apps based on Mobile phone

Factor	Variables	N	Mean	SD	df	t	Sig. (2 tailed)
Effective integration of educational smartphone apps	Yes	309	57.95	7.142	309	-.009	.993
	No	2	58.00	2.828			

The table shows the results of an independent samples t-test that compares two groups (Yes and No) on a variable labelled OB3. The "Yes" group contains 309 people with a mean score of 57.95 and a standard deviation (SD) of 7.142, whereas the "No" group has two participants with a mean score of 58.00 and an SD of 2.828. The estimated t-value is -.009, with a significance level (p-value) of.993, well beyond the expected significance threshold of 0.05. This demonstrates that there is no statistically significant difference between the two groups.

Table No. 6

T-Test about effective integration of educational smartphone apps based on Student portal help?

Factor	Variables	N	Mean	SD	df	t	Sig. (2 tailed)
Effective integration of educational smartphone apps	Yes	271	57.80	6.241	310	-1.266	.206
	No	41	59.32	11.529			

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The table shows the outcomes of an independent samples t-test that compares the OB3 variable to two groups: yes and no. The Yes group has 271 people with a mean of 57.80 and a standard deviation (SD) of 6.241, whereas the No group comprises 41 participants with a mean of 59.32 and an SD of 11.529. The t-value is -1.266, and the p-value is.206, which exceeds the standard significance limit of 0.05. This means there is no statistically significant difference in OB3 scores between the two groups.

Table No. 7

Objective 1: To examine the impact of educational smartphone apps on student academic performance at university level.

ANOVA-Test about educational smartphone apps based on Gadget

Factor	Variables	N	Mean	SD	df	F	Sig.
Educational	Mobile	104	105.98	9.766	2	2.890	.057
Smartphone	Laptop	35	105.51	18.940			
Apps	Both	173	109.08	11.035			

This table displays the results of a one-way ANOVA that were used to match the mean scores across three groups: mobile, laptop, and both. The results revealed no major difference between the groups (F = 2.890, p =.057). The Mobile group had a mean score of 105.98 (SD = 9.766), the Laptop group had a mean score of 105.51 (SD = 18.940), and the Both group had a mean score of 109.08 (SD = 11.035), indicating that the type of device used made no significant difference in the outcome.

Table No. 8

ANOVA-Test about educational smartphone apps based on Search engine

Factor	Variables	N	Mean	SD	df	F	Sig.
Educational	Google	283	108.27	11.866	2	6.868	.001
Smartphone	Scholar	10	108.40	4.502			
Apps	Other	19	98.05	10.580			

This table shows the marks of a one-way ANOVA used to compare the mean scores of three groups: Google, Scholar, and Others. The results showed a significant change between the groups (F = 6.868, p =.001). The Google group had a mean score of 108.27 (SD = 11.866), the Scholar group had a mean score of 108.40 (SD = 4.502), and the Other group had a mean score of 98.05 (SD = 10.580), indicating that the stage employed had a substantial effect on the scores, with the Other group scoring particularly low.

Table No. 9

ANOVA-Test about educational smartphone apps based on SIM

Factor	Variables	N	Mean	SD	df	F	Sig.
Educational	Zong	57	101.49	16.265	2	9.930	.000
Smartphone	Mobilink	120	109.03	8.954			
Apps	Other	135	109.01	11.188			

This table displays the results of a one-way ANOVA that were used to link the mean scores of users from three distinct mobile networks: Zong, Mobilink, and Other. The results showed a major change between the groups (F = 9.930, p =.000). The average scores were as follows: Zong users had a mean of 101.49 (SD = 16.265), Mobilink users had a mean of 109.03 (SD = 8.954), and Other network users had a mean of 109.01 (SD = 11.188). This indicates that the mobile network type greatly influences the scores.

Table No. 10

ANOVA-Test about educational smartphone apps based on Internet pack

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Factor	Variables	N	Mean	SD	df	F	Sig.
Educational	Daily	22	101.09	25.688	2	6.188	.002
Smartphone	Weekly	33	103.91	12.030			
Apps	Monthly	257	108.69	9.600			

This table illustrate the outcomes of a one-way ANOVA were showed to relate the mean scores based on the frequency of app usage (Daily, Weekly, and Monthly). The results showed a major alteration among the groups, F= 6.188, p = .002. The mean scores were as follows: Daily users had a mean of 101.09 (SD = 25.688), Weekly users had a mean score of 103.91 (SD = 12.030), and Monthly users had a mean score of 108.69 (SD = 9.600). This recommends that the frequency of app usage has a significant impact on the users' scores.

Table No. 11

ANOVA-Test about educational smartphone apps based on Social media use

Factor	**Variables**	**N**	**Mean**	**SD**	**df**	**F**	**Sig.**
Educational	2hr	121	109.02	8.904	2	7.004	.001
Smartphone	4hr	64	102.80	17.074			
Apps	6hr	127	108.78	10.538			

This table illustrate the outcomes of a one-way ANOVA were led to equate the mean scores based on the amount of time spent using the app (2 hours, 4 hours, and 6 hours). The grades indicated a significant difference between the groups, F= 7.004, p = .001. The mean scores were as follows: 2 hours users had a mean of 109.02 (SD = 8.904), 4 hours users had a mean of 102.80 (SD = 17.074), and 6 hours users had a mean of 108.78 (SD = 10.538). This shows that the time spent using the app significantly marks users' scores.

Table No. 12

ANOVA-Test about educational smartphone apps based on Apps used

Factor	**Variables**	**N**	**Mean**	**SD**	**df**	**F**	**Sig.**
Educational	Facebook	95	109.01	10.389	2	2.070	.128
Smartphone	YouTube	173	106.43	12.274			
Apps	Instagram	44	109.48	12.880			

This table illustrate the outcomes of a one-way ANOVA were directed to associate the mean scores based on the social media platform used (Facebook, YouTube, and Instagram). The results showed no significant change among the groups, F = 2.070, p = .128. The mean scores were as follows: Facebook users had a mean of 109.01 (SD = 10.389), YouTube users had a mean of 106.43 (SD = 12.274), and Instagram users had a mean of 109.48 (SD = 12.880). This submits that the social media platform used does not significantly mark the users' scores.

Table No. 13

Objective 3: To identify best practices for the effective integration of educational smartphone apps within university settings.

ANOVA-Test about effective integration of educational smartphone apps based on Gadget

Factor	**Variables**	**N**	**Mean**	**SD**	**df**	**F**	**Sig.**
Effective integration of educational smartphone apps	Mobile	104	57.25	7.361	2	1.814	.165
	Laptop	35	56.86	9.121			
	Both	173	58.68	6.524			

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This table illuminate the outcomes of a one-way ANOVA were lead to link the mean scores varied slightly across device usage: Mobile users (N = 104) needed a mean score of 57.25 (SD = 7.361), Laptop users (N = 35) required a mean score of 56.86 (SD = 9.121), and those using Both devices (N = 173) had the highest mean score of 58.68 (SD = 6.524). However, the ANOVA result were not statistically significant, F = 1.814, p = .165, indicating no significant difference in OB3 scores based on the type of device used.

Table No. 14

ANOVA-Test about effective integration of educational smartphone apps based on Search engine

Factor	Variables	N	Mean	SD	df	F	Sig.
Effective integration of educational smartphone apps	Google	283	57.99	7.287	2	1.375	.254
	Scholar	10	61.10	3.725			
	Other	19	56.47	6.123			

This table illuminate the outcomes of a one-way ANOVA were lead to match the mean scores varied slightly across the source of information: Google users (N = 283) required a mean score of 57.99 (SD = 7.287), Scholar users (N = 10) had a mean score of 61.10 (SD = 3.725), and users of Other sources (N = 19) obligated a mean score of 56.47 (SD = 6.123). The ANOVA result were not statistically important, F= 1.375, p = .254, specifying no significant difference in OB1 scores based on the cause of information used.

Table No. 15

ANOVA-Test about effective integration of educational smartphone apps based on SIM

Factor	Variables	N	Mean	SD	df	F	Sig.
Effective integration of educational smartphone apps	Zong	57	57.79	10.892	2	.214	.808
	Mobilink	120	57.76	6.101			
	Other	135	58.30	5.998			

The table shows the results of a one-way ANOVA linking the OB3 variable across three groups: Zong, Mobilink, and Other. The Zong group has 57 participants by a mean of 57.79 and a standard deviation (SD) of 10.892, the Mobilink group has 120 participants with a mean of 57.76 and an SD of 6.101, and the Other group consists of 135 participants with a mean of 58.30 and an SD of 5.998. The F-value is .214, by a significance level (p-value) of .808, which is much greater than the collective edge of 0.05. This recommends that there is no statistically significant difference in the OB3 marks between the three clusters.

Table No. 16

ANOVA-Test about effective integration of educational smartphone apps based on Internet pack

Factor	Variables	N	Mean	SD	df	F	Sig.
Effective integration of	Daily	22	53.23	13.979	2	5.804	.003
	Weekly	33	57.36	10.090			

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educational smartphone apps	Monthly	257	58.49	5.583			

The table presents the results of a one-way ANOVA for the OB3 variable across three groups: Daily, Weekly, and Monthly. The Daily group contains 22 participants with a mean of 53.23 and a standard deviation (SD) of 13.979, the Weekly group has 33 members with a mean of 57.36 and an SD of 10.090, and the Monthly group has 257 members with a mean of 58.49 and an SD of 5.583. The F-value is 5.804, and the p-value is.003, which is less than the standard significance level of 0.05. This demonstrates a statistically significant difference in OB3 marks among the three groups.

Table No. 17

ANOVA-Test about effective integration of educational smartphone apps based on Social media use

Factor	Variables	N	Mean	SD	df	F	Sig.
Effective integration of educational smartphone apps	2hr	121	57.68	6.567	2	2.917	.056
	4hr	64	56.52	9.568			
	6hr	127	59.06	6.094			

The table illustrations the results of a one-way ANOVA for the OB3 variable across three groups: 2hr, 4hr, and 6hr. The 2hr group has 121 participants with a mean of 57.68 and a standard deviation (SD) of 6.567, the 4hr group has 64 participants with a mean of 56.52 and an SD of 9.568, and the 6hr group consists of 127 participants with a mean of 59.06 and an SD of 6.094. The F-value is 2.917, with a p-value of .056, which is slightly above the 0.05 threshold. This suggests that while there is a trend toward a difference in OB3 scores across the three groups, the result is not statistically significant at the conventional 0.05 level.

Table No. 18

ANOVA-Test about effective integration of educational smartphone apps based on Apps used

Factor	Variables	N	Mean	SD	df	F	Sig.
Effective integration of educational smartphone apps	Facebook	95	58.76	3.825	2	1.101	.334
	YouTube	173	57.47	8.368			
	Instagram	44	58.45	7.444			

The table presents the results of a one-way ANOVA for the OB3 variable across three groups: Facebook, YouTube, and Instagram. The Facebook group has 95 participants with a mean of 58.76 and a standard deviation (SD) of 3.825; the YouTube group has 173 individuals with a mean of 57.47 and an SD of 8.368; and the Instagram group has 44 people with a mean of 58.45 and an SD of 7.444. The F-value is 1.101, and the p-value is.334, which above the traditional significance limit of 0.05. This means there is no statistically significant variance in OB3 ratings between the three social media platforms.

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Table No. 19

Objective wise analysis using Pearson Correlation Coefficients

	O1	O2
O1	1	
O2	.696**	1

Note: O1. objective 1, O2 objective 2

The Pearson correlation value between Objective 1 (O1) and Objective 2 (O2) is r = 0.696, indicating statistical significance at the 0.01 level ($p < 0.01$). This demonstrates a substantial confident link between the two aims. In other words, if O1 levels increase, so do O2 values, and vice versa.

The diagonal values (1s) represent the correlation of each objective with itself, which is always 1.

16. Conclusion:

16.1: Educational Smartphone Apps:

The theme of the study were related to educational smartphone apps. The study concluded that the use of instructional smartphone apps improves students' academic performance at the university level. Students who utilized educational applications on a regular basis indicated increased academic engagement, time management skills, and mastery of course material. The findings suggest that mobile learning aids, when properly integrated into the academic setting, can be useful supplements to traditional teaching approaches. However, the level of influence were also determined by factors such as app quality, internet accessibility, and students' digital competence. As a result, systematic support and supervised deployment are critical for optimizing the academic value of educational smartphone apps.

16.2. Effective Integration of Educational Smartphone Apps:

The theme of the study were related to effective integration of educational smartphone apps. The study identified several best practices for the effective integration of educational smartphone apps within university settings. These include ensuring that apps are aligned with curriculum goals, providing faculty training on app usage, and selecting apps that promote interactive and student-centered learning. Regular technical support, feedback mechanisms, and digital literacy workshops for students were also found to enhance app effectiveness. Furthermore, institutional policies should encourage the use of reliable, user-friendly, and data-efficient apps. Overall, strategic planning, stakeholder involvement, and continuous evaluation are key to maximizing the educational value of smartphone apps in higher education.

17. Limitations:

Since our study focusses on university students who use smartphones to enhance their academic learning activities, it is concerning that these students are based in Multan. The study's sole restriction is that we only looked at one city because we lacked the time and money to expand our research to other Pakistani cities. These issues should be taken into consideration the next time researchers want to conduct a study of this kind.

Since this study is quantitative in nature, the subsequent method will be qualitative.

Additionally, we are worried about how smartphones affect learning habits and academic achievement. Future research on the impact of cellphones should include a number of additional potential variables.

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