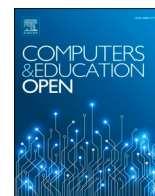




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Uses and gratifications of educational apps: A study during COVID-19 pandemic

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ABSTRACT

Although educational apps have emerged as an easily available and accessible alternative to classroom learning, particularly at the time of pandemics like COVID-19, no research has attempted to identify learners intentions behind the usage of different educational apps. The current study developed a valid and reliable research instrument to measure the motivations behind using educational apps. Using the mixed method approach commonly used in uses and gratification (U&G) research, i.e., open-ended essays & national survey (N = 552), this study identified seven gratifications behind learners intention to use educational apps: academic assistance, convenience, entertainment, social influence, novelty, engagement and activity. The result suggests that academic assistance, convenience and social influence were the significant predictors of the intention to use educational apps. The current research also identified the moderating effect of gender in selecting educational apps. One of the most significant contributions of the present study is that it extended the uses and gratification theory applications beyond the traditional media to explain the intention to use educational apps.

1. Introduction

The advancements in communication technology have resulted in various applications for accessible and affordable education. As a result, students and educators have access to new technologies, gadgets, and applications to augment their pedagogical experiences [38]. Applications based on digital technologies have transformed the teaching and learning experience by opening up myriad opportunities [40,109]. The rapid internet connectivity, developments in phone technology and the emergence of compact and compatible smartphones and tablets have put "education" into "apps" [51]. Educational apps reduce the cognitive load on the learners by easily and effectively communicating concepts and contents with a faster flow of information beyond time and space [22,40,123].

Past studies have identified that well-designed educational apps can facilitate an interactive learning experience [25,35,75]. Researchers found that various factors motivate learners intentions to use educational apps. Scholars have observed that motives such as entertainment [4,20,39,76], convenience [35], academic assistance [21,35,75], interactivity [23] and engagement [35] influence students' selection of educational apps.

The review of prior literature shows many gaps in the existing literature. First, although educational apps have emerged as an

important learning alternative in most countries, very scant literature is available on the motives behind their usage. The available literature on educational apps focused more on app design [39,85,93] and content features [32,115] besides identifying various user motivations. For example, Falloon [39], in his study on iPad based educational apps, identified interactive design, convenience, and entertainment gratifications that motivate students to use learning apps. However, the primary objective of his study was to explore how the app design and content influence students learning pathways. Similarly, past studies like Bomhold et al., [13], Falloon [40], Dubé et al.; [35], Dias & Brito [33] etc., gave more emphasis on educational apps' contents, their design and various features, besides locating various user motivations.

Second, the limited prior literature ([16] & [17,75]) investigating the user motivations of educational apps portrays an ambiguous picture of the learners' motives for using educational apps by providing conflicting results. Third, the existing literature analysed the usage of educational apps from teachers' [16] & [17,52]) or parents' [80,121] perspectives. The end-users of the educational apps are students, and literature probing into students motives for using educational apps are not available yet. Consequently, an investigation of educational apps' various uses and gratifications (U&G's) and the intentions behind their usage is highly warranted. We argue that various U&G's behind educational apps are significantly associated with learners intention to

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use them.

Lastly, educational apps became increasingly popular across the globe recently after the outbreak of the COVID-19 pandemic (Kondylakis et al., 2020; [95]). The lockdowns and social distancing norms have disrupted the education sector, and physical attendances of schools and colleges were suspended for a long time, making the students and educators search for a feasible alternative [106,112]. Through advances in technology, accessibility and affordability, educational apps emerged as a viable alternative for classroom teaching. In addition, the COVID-19 crisis further caused a surge in the usage of educational apps across the globe [103]. During COVID-19, India witnessed an unprecedented spike in the usage of educational apps [30,74]. However, no study has ever attempted to identify what motivates students to use educational apps in India.

The current study addresses the gap mentioned above by examining the different uses and gratifications behind the usage of educational apps exclusively from the students perspective and thus provide a new dimension to the existing literature. Also, understanding the motives for using educational apps and gratifications sought or obtained from them help educators to design the content in accordance with the learners taste and alter the pedagogy to facilitate an interactive learning experience. Unlike the prior studies, we conducted our study in India, a developing and culturally diverse country, thus increasing its external validity. Scholars [70,101] argue that conducting research on a culturally diverse country can increase the study's external validity. Another unique contribution of this study is that we have used the Uses and gratification theory as our theoretical framework to understand the various motivations behind the usage of educational apps. Thus we have extended the U&G theory beyond the conventional media to locate the gratifications obtained from educational apps.

The primary focus of this study is to identify learners motives for using educational apps in India. We utilised a mixed-method approach, including qualitative and quantitative methods, to locate the user motivations. After identifying the user motivations, we developed a comprehensive research model and tested it to see which motive better predict the intention to use educational apps. Finally, we also attempted to see the moderating effect of gender in the usage of educational apps. Further, the current research also has some important theoretical and practical implications.

2. Literature review

An educational application or simply an 'educational app' is a software programme integrated with learning materials that can be downloaded and installed on mobile phones or tablets [27]. Educational apps allow students and learners to access content anywhere, anytime [13,32,115]. Smartphones and tablets with touch screen facilities have increased the popularity of educational apps among students, teachers and parents [53,85,93]. Although many studies have been conducted on educational apps, very few researchers have attempted to identify the motivations for using educational apps [86]. 'Motivations are general dispositions that influence people's actions taken to fulfil a need or a want ([84], p.179)'. Identifying the motivations behind using a particular media can predict the recurring usage of the media [91]. Most of the prior studies that analysed the motivations for using educational apps were conducted on developed or western countries such as Canada [75,35], Malta [21], United States [51], New Zealand [39], Netherlands [16,17], and Portugal [33].

Falloon [39] conducted a study on iPad-based educational apps to identify factors influencing students' learning pathways in New Zealand. However, their study focussed primarily on the design and content features of the apps developed for school children; they also identified that interactive design, convenience and entertainment were some of the parameters that motivated teachers to recommend apps for children. Some of the recent studies also support these findings. For example, researchers [4,20,76] recommended the usage of virtual reality and

augmented reality in the design of educational apps to make them more interactive and entertaining. Papadakis et al., [85] and Dias & Brito [33] also located entertainment as an important motivation behind the adoption of learning apps.

Many researchers [21,22,35,75] stressed that academic assistance is one of the key gratifications that motivate students to adopt educational apps. For example, Camilleri & Camilleri [23] conducted a qualitative study with the help of semi-structured face to face interviews with students between 6-8 years of age in Malta. Their study results showed that although academic assistance is the primary motivation behind educational apps, students also reported that interactive and engaging educational apps had improved their academic competency. Camilleri & Camilleri [23] also recommends the gamification of educational apps as many students expressed that entertaining content also motivates them while choosing educational apps.

Dubé et al., [35] argue that well designed educational apps can facilitate an experience of multi-level engagement that can improve the competence in the subject being taught. Their study also underscored that student engagement occurs because of the novelty of the new technology, the interactivity of the apps, entertainment or gamification and convenience such as hands own aspect of the touch screens. Hirsh-Pasek et al., [51] also suggest that the popularity and acceptance of education apps largely depend on course content and their meaningful, interactive and engaging presentation.

Social influence is regarded as one of the major factors influencing the adoption of new technologies [8,46,50,118]. Researchers ([21,24] & b) have found a positive association between the usage of educational apps and social influence. Children's selection and usage of educational apps are largely decided by their parents [80,121]. Broekman et al., [16] conducted a study to identify factors that motivate parents while selecting their children's apps using U&G theory. The study result showed that parents expect five gratifications when they select learning apps for their children, i.e. need for entertainment, information seeking, social interaction, emotional satisfaction and passing time. Another study conducted by Broekman et al., [17] on parents of young children aged 3-7 to identify the app features that fulfil parents' need for selecting apps for their children and identified four U&Gs: clear design; tailorable, controllable, educational content; challenges and rewards; and technological innovation behind educational app selection. Their study also revealed that a child's age and gender play a key role in app selection. Similarly, Montazami [75] identified five motives behind parents' intention to download apps for their children, i.e. scaffolding, academic utility, the development team's expertise, feedback, and learning theory.

Dias & Brito [33] recently conducted a study to locate the factors that influence the selection of education apps from perceptions of students, parents and app developers. The results showed that students, parents and app developers have different perspectives on selecting apps. Students preferred education apps that afford entertainment. On the other hand, parents were inclined to apps that provide good academic assistance. Their study concluded that since children and parents have contrasting perspectives on app selection, developers struggle to please both.

The review of prior literature shows many gaps in the existing literature. First, although educational apps have emerged as an important learning alternative in most countries, very scant literature is available on the motives behind their usage. Even though educational apps are widely used in developing countries like India, it has not received much scholarly attention. However, a few recent studies [30,77] related to online learning at the time of the COVID-19 indicated a sudden boom in educational apps downloads. COVID-19 pandemic has intensified the usage of educational apps, and they are slowly and steadily expanding their digital footprints even in remote areas of developing countries like India [74,77].

Second, the above mentioned existing literature on educational apps provides an ambiguous picture of the learners' motives for using

educational apps. Although past researchers have observed entertainment, convenience, academic assistance, interactivity and engagement influence students' selection of educational apps, the main objectives behind these studies were not to locate the motivations behind students uses of educational apps. Rather these studies were focused more on app design and its content features. Two of the specific studies by Broekman et al., [16] and Broekman et al., [17] to identify the motives behind using educational apps were from the parents perspective instead of learners. Also, the results of these two studies were conflicting as they identified different sets of motivations unrelated to each other. Thus, the analysis of prior research findings demands an exclusive study on students' motivations for using educational apps from students' perspectives, particularly from developing countries that are largely affected by the COVID-19 pandemic. To address the existing research gap, we ask the following research question:

RQ1: What are the learner's primary motives for using the educational apps?

In technology adoption research, 'intention to use' is considered an important determinant that reflects the recurring usage of a particular technology [113,114]. Various intrinsic and extrinsic factors influence people's intentions to use new technology. Motives for using a particular technology or the gratification obtained is considered as one of the significant predictors of users' intention to use new technology and applications [88]. Prior studies ([21,24,62,97]&b) suggest that motivations behind the usage of educational apps influence learners intentions to use them. For example, Camilleri & Camilleri [21]&b) have found a positive association between the usage intention of educational apps and social influence.

Similarly, Shroff & Keyes [97] observed that educational apps' interactivity and engagement positively influences learners intention to use them. In the light of these findings, it is plausible to assume that students motives for using educational apps can predict their intention to use them. Hence we pose our second research question:

RQ2: Which usage motive better predict the intention to use educational apps?

2.1. Gender difference in educational apps usage

Prior research ascertained that males intentions to use the internet and related technology-driven by leisure, entertainment and functional needs, whereas females use the internet and associated applications more for social interaction and communication [94,116]. Moreover, past studies indicate that a gender difference exists in the uses and gratification of smartphone usage. For example, studies [3,78] have ascertained that male and female students' time spent on smartphones is significantly different. Andone et al., [3] observed that females spent more time on mobile phones than males, with an average difference of about 8%. Similarly, Nayak [78], in his study on students smartphone usage and addiction in India, found that females spent more time on smartphones than male students. As educational apps are a new entrant and most of them are designed to operate on smartphones with an active internet connection, we assume that the intentions to use educational apps are sensitive to gender. Hence to explore the influence of gender in the usage of educational apps, we asked the following research question:

RQ3: Do the intentions to use educational apps differ depending on the gender of its users?

To address the research questions, we have used the Uses and gratification theory as our theoretical framework.

2.2. Uses and gratification theory

Uses and gratification (U&G) theory is the widely utilised theoretical framework to explain the different motives and reasons behind the usage of any given medium [43,57]. U&G theory assumes that the media can satisfy people's innate needs [91]. Gratifications are conceptualised as the satisfaction people receive when their innate requirements are fulfilled by the media usage that matches their expectations. In other words, gratifications are the perceived fulfilment of one's needs through media usage [83]. The most important tenets of this theory are that users are active, selective, and motivated to use a particular media [57,87]. Hence U&G theory provides a user-centred angle of the various socio-psychological gratifications obtained from a given medium [64]. Although this theory originated pre-digitalisation era, scholars widely used it to examine the gratifications obtained from new communication technologies like the internet [84] and social media [117].

To address the various challenges and conceptual refinement of U&G theory posed by scholars in the light of emerging technologies, Sundar & Limperos [108] suggested that U&G scholars consider the technology themselves while assessing audiences' media usage gratifications. Sundar & Limperos [108] reviewed prior U&G studies on various media technologies since the 1940s. They pointed out the need to tap the potential gratifications emerging from new interactive media, which gave rise to the MAIN model and U&G.2.0. The MAIN model helps to devise the potential gratifications emerging from new media in the light of four classes of affordances, i.e., modality, agency, interactivity, and navigability. Based on their MAIN model Sundar and Limperos [108] suggested that usage of new media (e.g., smartphones, smartphones' apps) paved the way for new sets of needs, called "medium-specific needs". Therefore, while examining the uses and gratifications from new media technologies besides considering "general needs", researchers should also emphasise emerging "medium-specific needs". Thus, the U&G theory is an axiomatic and robust theory that can examine the gratifications from traditional and new media.

Furthermore, scholars have used U&G theory to study the gratifications behind using new technologies such as mobile phone usage [64], internet use [31,84], social media [117] and various smartphone applications: E.g. Facebook [5,100], Instagram [2,96], Tinder [105], TikTok [73] etc. U&G theory was also used to study educational apps in two different contexts. i.e. parents motives for choosing apps for their children ([17] & 2019) and learners motives for selecting apps for themselves [75]. Therefore, we utilised the U&G theory as our theoretical framework for exploring the intention to use educational apps.

3. Methodology

3.1. Scale development

Because of the availability of scanty literature on the topic under study, we have used a mixed-method [71] approach to develop the scale. The mixed-method uses a qualitative approach and a cross-sectional survey [88,111]. Initially, an open-ended essay writing (Dhir et al., 2017; [111]) with 58 educational app users was conducted. Open-ended essays are the easiest and most parsimonious method to gather in-depth qualitative data [111] and are widely used by the child and adolescent researchers working on human-computer interaction [14,56]. In qualitative essays, predefined questions or themes were given to the respondents to instigate them and build up and share their ideas and experience.

The samples were selected randomly from the pool colleges in Southern India obtained from their affiliated universities' websites. Twenty colleges were selected initially, and selected colleges were contacted by email and telephone and informed of the study objectives, research procedure and expected benefits from the research. Four colleges were agreed to participate in the study. All the colleges that agreed to participate were private colleges, and the medium of instruction was

English. The author, along with the help of teachers, distributed the open-ended survey questionnaire to students who agreed to participate. Students completed the essays between January 2020 to February 2020. Participation in the survey was voluntary, and students were free to withdraw from the survey anytime. The survey was confidential, and no personal information was collected.

The qualitative essays focussed on various issues related to the usage of educational apps. However, in the current study, the focus is only on the uses and gratifications of educational apps. The grounded theory approach [9,49,61] with affinity diagramming was utilised to analyse the data collected through the open-ended essays to locate and classify the themes based on their commonalities.

In affinity diagramming, researchers go through essays thoroughly to analyse and record each participant's response. The data analysis was concluded with the development of different themes representing various gratifications obtained from educational apps. The themes obtained were classified and categorised through the uses and gratification theory lens. The qualitative data analysis identified seven themes, i.e. academic assistance, social influence, convenience, entertainment, engagement, novelty and activity. Based on the suggestions of prior literature [92,111], the pool of items that emerged from the qualitative analysis is placed for a review before a group of experts, including professionals in app development and academicians. This expert review was to know whether changes are required in the questionnaire's wording and ensure that the survey instrument is error-free. The questionnaire is also pilot tested among a few students before final data collection. The final questionnaire after the pilot testing depicting seven gratifications was used for final data collection. A five-point Likert scale anchoring between 1 (strongly disagree) to 5 (strongly agree) was used to measure the items.

3.2. Survey participants and procedure

The population identified for the study were high school and college students up to post-graduation in the age group ranging from 15-25 years from India. Data collection was done between March 2020 to February 2021. Data collection utilised an internet-based national survey using a snowball sampling method. The targeted respondents were accessed through multiple methods, e.g., hosting the survey links on various social media platforms (like- WhatsApp, Facebook, Instagram, Telegram), asking students who already completed the survey to share among their friends' networks, and requested teachers to post the survey link on online teaching platforms and ask their students to fill the questionnaire.

The resulting sample (N = 552) consisted of 53.3 % female and 46.7 % male students with an average of 18 years. The minimum age of the respondents was 15, and the maximum age was 24. Most of the participants were higher secondary students, followed by graduate students. The average time spent on educational apps in a single sitting is about 47 minutes. The majority of the students (62.6%) prefer to use mobile phones for accessing educational apps (See Table 1)

3.3. Research model

The researchers used U&G as the theoretical lens and proposed a model consisting of seven different U&Gs as the predictor variables. Prior scholarship [87] suggests that identifying U&Gs is important because these gratifications can influence actual technology use. The intention to use (adapted from [88]) is the only criterion variable (see Fig. 1). Past literature utilised U&G theory to delineate the influence of various U&Gs on usage intentions [42,67,68]. Hence, we assume that the U&G theory can provide an axiomatic and closely fitting theoretical framework for identifying the relationship between the U&Gs of educational apps and their usage intentions.

Past researchers [88,108] have classified the gratifications of media usage into four main categories: content, process, social and technology.

Table 1
Sample characteristics.

	Characteristic	Frequency/ Mean	Percentage (%) /S. D
Age		18.3 Years**	2.58
Gender	Male	258	46.7%
	Female	294	53.3%
Education	Secondary level (10 th grade) and below	92	16.7%
	Higher Secondary (10+2)	218	39.5%
	Graduation	127	23%
	Post-graduation	115	20.8%
Frequency of usage	Every day	131	23.7%
	Once in two days	201	36.4%
	Few times a week	125	22.6%
	Few times in a month	95	17.2%
Usage duration	Average time spent on a single sitting	47 Minutes	38.22
Device used	Mobile Phone	346	62.6%
	Tablet	206	37.4%

N = 552.

** Minimum age was 15 and Maximum was 24.

Guided by this, the seven U&Gs emerged from our qualitative data analysis is classified into four dimensions: process (i.e. convenience), social (i.e. social influence), content (i.e. academic assistance, entertainment) and technology (novelty, activity and engagement). The different research hypotheses were developed in the light of this classification and presented below.

3.4. Hypotheses

Academic assistance in this study refers to the academic help extended by the educational apps to learners in the form of audio or video lectures and e-course materials. Educational apps available in the market are designed to help students learn their courses easily [51]. Besides providing extensive information related to the course of study, these apps also help students complete their regular classroom assignments, prepare them for examinations by conducting mock tests, and give extra information about their course beyond their proposed syllabus. The prior literature studied academic assistance provided by the educational apps from different contexts ([21,22]& [35,75]). Furthermore, scholars [53,66] have also found a positive relationship between academic assistance and the intention to use educational apps. Therefore we hypothesise that:

H1. Academic assistance gratification is positively associated with the intention to use educational apps.

Entertainment in the present study refers to designing educational content interestingly to catch the learners' attention. Most educational apps make their content interesting by using entertaining language or with the help of eye-catching pictorial representations or with the help of good quality graphics and animation. Furthermore, such apps are integrated with features that make students play and learn [122]. This kind of gamification approach of education increases learners motivation and engagement by incorporating the game design environment with the educational environment [34]. In addition, some apps use virtual reality (VR) or augmented reality (AR) techniques to make their content more interactive and entertaining [4,20,76,82]. Prior research [33,39,85] shows that entertainment is an important aspect of adopting learning apps. Therefore, we propose:

H2. Entertainment gratification is positively associated with the intention to use educational apps.

Convenience in this study refers to the perceived ease of use of

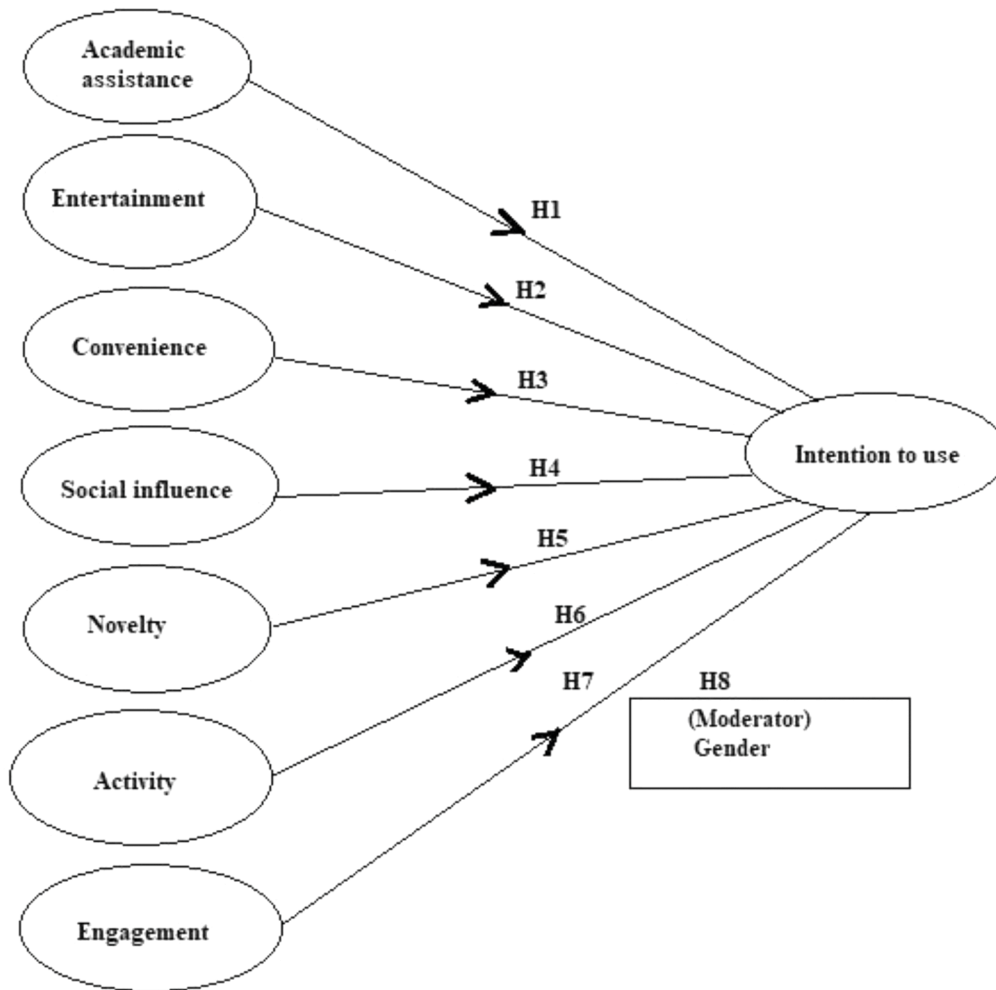


Fig. 1. The proposed research model.

educational apps. Educational apps allow users to install it on their mobile phones or tablets and enable them to access it anywhere anytime [13,44,115]. Furthermore, some of the educational apps are stand-alone. It comes preloaded in a tablet which often does not require an internet connection making them more convenient and easily accessible [10]. Besides these, most educational apps allow users to navigate and filter content and make them read, listen or watch the specific content they require [58]. Also, users can bookmark content and resume or play from the point where they have stopped previous lectures or sessions. In the case of video lectures, students can play, rewind and watch the lecture as much as they want. Also, the convenience of educational apps enables students to learn from their homes even in difficult times of pandemics like Covid-19 [6,77,106]. Hence the current study proposes:

H3. Convenience gratification is positively associated with the intention to use educational apps.

Previous research [88] has identified that peers, family, friends, teachers and various media can influence product purchase and use intentions. In the context of the study undertaken here, social influence can be identified as the advices from educational apps from many sources such as friends, peers and mass media. Prior studies have identified social influence as one of the major determinants in adopting new technologies such as mobile applications [8,46,50,118]. Furthermore, scholars [23,24] have found a positive relationship between the usage of educational apps and social influence. Therefore in the current

research, we hypothesise that:

H4. Social Influence gratification is positively associated with the intention to use educational apps.

Novelty in this study refers to the technological affordances of the educational apps, like their newness and unusual user experience [108]. Novelty is a medium-specific gratification [65] that emerged due to the advancement of user interactions with newer gadgets. Sundar & Limperos [108] classified novelty under modality based gratification and suggest that newer media has given rise to new features like mobile apps. As far as educational apps are concerned, they offer interactive content to engage and comprehend learners easily. In their MAIN model, Sundar & Limperos [108] argue that new media's technological affordances can instigate cognitive heuristics in users. Past studies [19,55,59] have found that novelty gratification positively influences the intention to use mobile apps. Hence in this study, we propose that:

H5. Novelty gratification is positively associated with the intention to use educational apps.

Activity refers to the technological affordance that facilitates real-time interaction with the content and features of the app. Sundar & Limperos [108] argue that interactivity affordances triggers a heuristic and allow users to interact with and through the medium (pp.515). The interactivity affordance makes the digital applications meaningful [102, 107]. All the educational apps have an interactive interface that allows

the learners to interact with them and keeps them engaged [11]. Also, few studies on mobile apps [79,119] suggest that interactivity positively predict the intention to use mobile apps. Therefore, we assume that interactivity is likely to positively affect the educational apps' usage intention. Hence we state our next hypothesis :

H6. Activity gratification is positively associated with the intention to use educational apps.

In the current study, engagement refers to the users' degree of involvement with the learning process. Educational apps have many features that help learners stay on the medium and reduce the impediments that distract them. According to Hirsh-Pasek et al., [51], the quality of the educational apps depends upon their ability to support students engagement with the learning process. Dubé et al., [35] suggested that a well-designed education app creates an environment for the students to experience multi-level engagement, leading to increased interest in learning. Prior studies [60,62,97] suggest that educational apps' engagement positively influences their intention to use. Hence we argue that:

H7. Engagement gratification is positively associated with the intention to use educational apps.

Prior studies suggest that a gender difference exists in the uses and gratification of various media. Andone et al., [3] and Nayak [78] have ascertained that male students' time spent on smartphones and female students is significantly different. They found that female students spent more time on mobile phones than male students. In another study, Zhou & Xu [120] observed that females are lesser competent in adopting new education technologies. Albelali & Alaulamie [1] conducted a study on mobile learning apps among Saudi Arabian students and found that male students had more inclination towards using M-learning apps than females. In the light of prior research, we argue that gender moderates the usage of educational apps. Thus we hypothesise:

H8. There is a significant difference in the intention to use educational apps across male and female students.

3.5. Data analysis

The data gathered through essays were analysed with the help of the grounded theory approach [15,26,45] using NVivo 12. The survey data were analysed with SPSS 23.0 and AMOS. The research model was tested using the structural equation modelling (SEM) procedure [47]. As part of the procedure, a confirmatory factor analysis (CFA) was conducted to establish the proposed research model's goodness of fit and confirm its reliability and validity. After the model was statistically confirmed, then research hypotheses were tested.

4. Result

4.1. Measurement model

We performed CFA using the robust Maximum Likelihood algorithm [89]. The proposed measurement model was examined using popular goodness of fit indices. The CFA confirmed that the measurement model possess a good model fit with $\chi^2/df = 3.23$, Comparative fit index (CFI) = 0.95, Tucker-Lewis Index (TLI) = 0.93, and Root mean square error approximation (RMSEA) = 0.06 [18]. The final solution of constructs and indicators are depicted in Table 2.

4.2. Reliability and validity

The CFA checked the reliability and validity of the measures. Convergent validity is checked by looking into the average variance

Table 2
Factor loadings of measurement and structural model.

Study measures	Measurement items	CFA ^a	SEM ^b
Academic Assistance (AA)	AA1: To get guidance on the course of study	0.46	0.46
	AA2: To prepare for the examination	0.83	0.83
	AA3: To clarify doubts related to course	0.86	0.86
	AA4: To get extra information related to course	0.78	0.78
Convenience (CN)	CN1: It is convenient as I can use it anywhere, any time	0.75	0.75
	CN2: I can avoid seeing this, which I do not want to see	0.83	0.83
	CN3: I can pause, rewind and watch	0.82	0.82
	CN4: I can watch at my own pace and time	0.78	0.78
Engagement (EG)	EG1: It is like communicating face to face	0.91	0.91
	EG2: It is very interesting	0.93	0.93
	EG3: It is very engaging	0.59	0.59
Novelty (NV)	NV1: It is new	0.78	0.78
	NV2: The experience is unusual	0.79	0.79
	NV3: The technology is innovative	0.57	0.57
Social Influence (SI)	SI1: Because my friends and peers are using it	0.83	0.83
	SI2: Because it is the new trend	0.77	0.77
Activity (AC)	SI3: Because I have seen it in advertisements	0.80	0.80
	AC1: I feel active when I use it	0.73	0.73
	AC2: It is not a passive interaction	0.81	0.81
Entertainment (EN)	AC3: I get to do a lot of things on it	0.82	0.82
	EN1: Because it is entertaining	0.73	0.73
Intention to Use (IU)	EN2: Because it is enjoyable	0.74	0.74
	EN3: Because it is fun	.805	.805
	IU1: I may use educational apps in future	0.95	0.95
	IU2: If I get an opportunity, I will prefer to use educational apps	0.53	0.53
	IU3: I intend to keep on learning through educational apps	0.93	0.93

Note:

^a Factor loadings from the measurement model.

^b Factor loadings from the structural model CFA = Confirmatory Factor Analysis, SEM = Structural Equation Modelling.

extracted (AVE) for each study of the measures [47]. (Refer Table 3). From the table, it can be seen that all the study measures have good convergent validity and discriminant validity [41,47]. Besides these, the construct reliability scores (CRS) of the study measures were higher than the defined limit, i.e. 0.75 [28,29,81], confirming its construct reliability (see Table 3).

4.3. Structural model testing

The proposed structural model returned a good fit with model fit with $\chi^2/df = 3.23$, Comparative fit index (CFI) = 0.95, Tucker-Lewis Index (TLI) = 0.93, and Root mean square error approximation (RMSEA) = 0.06 [18]. Also, the model explained high percentages of variances [48], i.e., 49 % of the variance in usage intentions (see Fig. 2). The hypotheses H1, H3, and H4 were supported (see Table 4) because academic assistance ($p < 0.01$), convenience ($p < 0.05$), and social influence ($p < 0.001$) U&Gs were found to be significant positive predictors of education app usage intentions.

The current study's findings are supported by past research [22,23,35,75] that identified academic assistance as a significant predictor of students usage of educational apps. Scholars [23,24] have found a positive association between the usage of educational apps and social influence. Our study corresponds to this finding by identifying social influence motive as a significant positive predictor of usage intention. Lastly, supporting prior studies [6,58,77,106], in the current study, convenience gratification obtained from educational apps positively

Table 3

Mean, S.D, discriminant and convergent validity. EG = Engagement, SI = Social influence, CN = Convenience, AC = Activity, EN = Entertainment, NV = Novelty, AA = Academic Assistance, IU = Intention to Use, S. D = Standard Deviation, AVE = Average Variance Extracted, MSV = Maximum Shared Variance.

	CR	Mean	S. D	AVE	MSV	EG	SI	CN	AC	EN	NV	AA	IU
EG	0.907	4.02	0.84	0.772	0.318	0.879							
SI	0.848	4.14	0.81	0.651	0.473	0.564	0.807						
CN	0.880	3.90	0.88	0.646	0.473	0.503	0.688	0.804					
AC	0.836	4.15	0.89	0.629	0.416	0.480	0.645	0.542	0.793				
EN	0.807	3.97	0.89	0.583	0.449	0.470	0.615	0.670	0.562	0.764			
NV	0.765	3.51	1.12	0.525	0.235	0.341	0.134	0.333	0.270	0.358	0.725		
AA	0.834	3.68	1.01	0.568	0.441	0.428	0.528	0.664	0.383	0.546	0.485	0.754	
IU	0.894	3.99	0.84	0.750	0.446	0.414	0.668	0.581	0.457	0.461	0.197	0.515	0.866

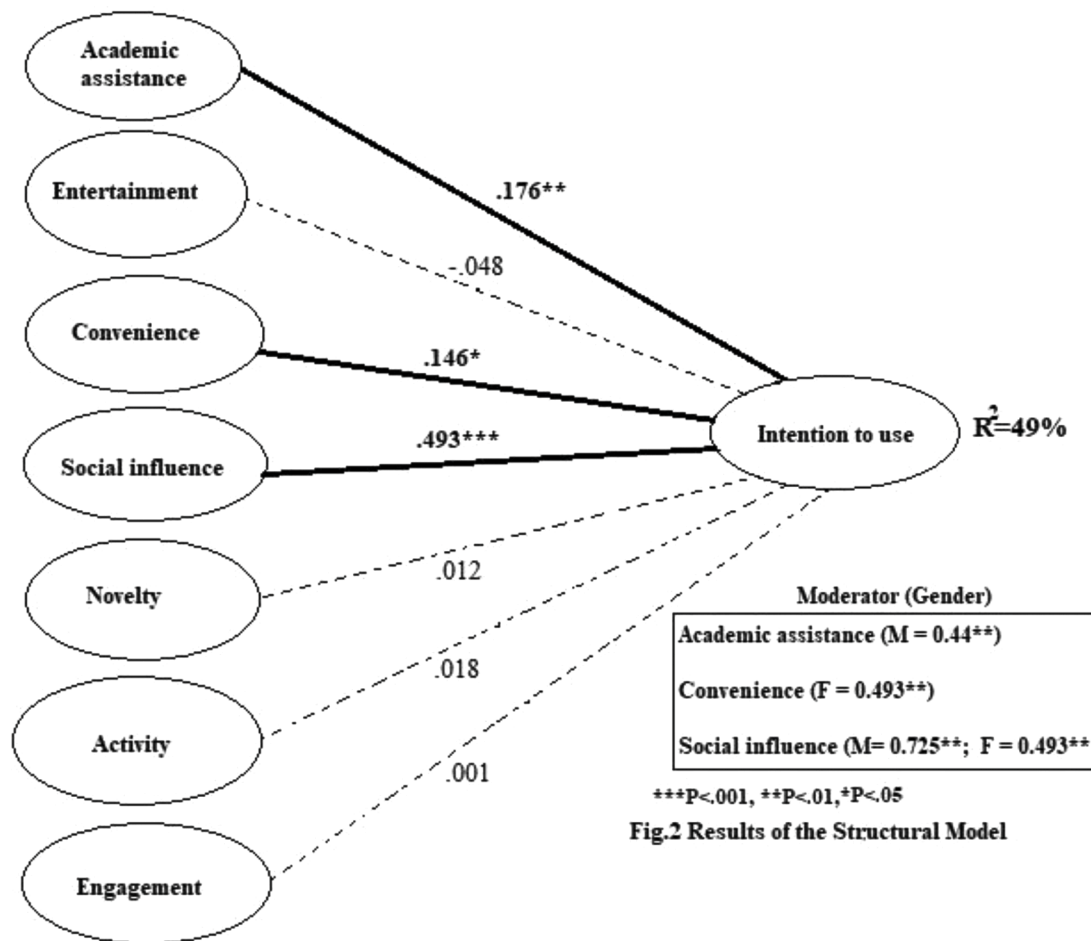


Fig.2 Results of the Structural Model

Fig. 2. Results of the structural model.

Table 4

Results of hypothesis (# H) testing.

Hypotheses	Path	β	p
H1	Academic assistance → Intention to use	0.176	<0.01
H2	Entertainment → Intention to use	-0.048	n.s
H3	Convenience → Intention to use	0.146	<0.05
H4	Social influence → Intention to use	0.493	<0.001
H5	Novelty → Intention to use	0.012	n.s
H6	Activity → Intention to use	0.018	n.s
H7	Engagement → Intention to use	0.001	n.s

n.s = not significant.

predicted intention to use them.

4.4. Moderation analysis

The final hypothesis in the present research was to check the moderating effect of gender (H8). It has been assumed that the intention to use educational apps differed among male and female students significantly. In the current study, a two-group model is used to find whether gender moderates the intention to use educational apps. The result (see Table 5) shows that the intention to use educational apps is significantly varied among the male and female users showing a moderating effect. It is observed that academic assistance and social influence gratifications influence male students' intention to use educational apps, whereas convenience and social influence gratifications influence the female students' intention to use educational apps.

Table 5
Gender as a moderator.

Hypothesised Paths	Standard Estimate	
	Male	Female
Academic assistance → Intention to use	0.400**	0.250
Entertainment → Intention to use	-0.200	0.011
Convenience → Intention to use	0.089	0.321*
Social influence → Intention to use	0.725***	0.493***
Novelty → Intention to use	-0.026	0.035
Activity → Intention to use	0.020	0.039
Engagement → Intention to use	0.018	-0.028

***p < 0.001, **p < .0.01, *p < 0.05

This finding corroborates the findings of Zhou & Xu [120] and Albelali & Alaulamie [1].

5. Discussion

Recent studies [6,7,106,112] have shown that COVID -19 pandemic has disrupted the traditional classroom education system, and students were forced to adapt themselves to the online class and learn through apps. Many developing countries like India have been affected by the COVID-19 pandemic. Schools and colleges were closed for a long time to protect the students from viral infections, and alternative mechanisms such as online learning and learning through apps were put in place to cope with [77]. Educational apps play a vital role among the different measures and methods to cater to quality education during COVID-19. Due to their portability, interactivity and entertaining content, educational apps successfully struck a chord among students, parents and teachers in India (India Today, 2020 [54]). In the backdrop of this extreme situation, the first research question of the current study was intended to investigate the uses and gratifications behind the use of educational apps. The present study is the first empirical research that looks into the different U&Gs for using educational apps.

Furthermore, the study examines which gratification motive better predict the intention to use educational apps. This study used a mixed-method approach that involved open-ended essays with 58 educational apps users and an internet-based cross-sectional survey with 553 education app users in India during the COVID-19 pandemic. The current research utilised the Uses and Gratification theory as its theoretical framework to locate learners intentions and motivations for using educational apps. This research offers potential theoretical and practical implications for academicians, researchers, educational app developers and app users.

The first research question was stated to identify learners' motivations behind using educational apps. The current study identified seven motivations for using educational apps: academic assistance, convenience, entertainment, social influence, novelty, activity, and engagement. The finding is consistent with the past scholarships [16,17,23,33,36,51], which reported that academic utility, convenience, user interactivity, and entertaining content were the motivations behind the adoption of educational apps. Besides this, our study also confirms that parents and students have slightly different motives for choosing educational apps. For example, Broekman et al., [16] identified five gratifications for parents selecting education apps for their children: need for entertainment, information seeking, social interaction, emotional satisfaction and pass time. But, except for entertainment, no other gratifications emerged in our study. Hence our findings support the argument of Dias & Brito [32] that students and parents have contrasting perspectives on app selection.

The first hypothesis of this study examined the relationship between academic assistance and the intention to use educational apps. The current research findings suggest a positive association between academic assistance and the intention to use educational apps. The result indicates that during the COVID-19 pandemic, many students depend on educational apps for learning. This finding corroborates recent literature

[22,23,33,35,66,75] that suggested the primary intention behind the education applications is academic assistance by bridging the gap between classroom learning and home learning [98]. In the light of this finding, we recommend students, parents, and educators increase the usage of educational apps in academics.

The second hypothesis investigated the association between entertainment gratification and intention to use educational apps. However, the findings of this study were inconsistent with past literature ([16,18]) by identifying no significant relationship between entertainment and the intention to use educational apps. The possible reason for disconnect can be due to the participants under study. Broekman et al., [16], [18] studied parents of primary school children, and our study focussed on high school and college students. Due to their high maturity level, they may be looking for more subject-specific content than entertaining content. Furthermore, Dias & Brito [32] found that young children and parents vary in their criteria for selecting educational apps. Children preferred apps that afford fun and entertainment, whereas parents preferred the academic utility of the apps.

The third hypothesis tested the relationship between convenience and intention to use educational apps. The study result supports this hypothesis which is in line with the findings of the past studies (e.g., [16, 51]). The perceived ease of use and accessibility of educational apps make it a convenient learning tool. Also, educational apps offer 'tailorable' and 'controllable' education content [17] that can comprehend easily. Thus, when educational institutions closed at COVID-19, these educational apps slowly and steadily created their niche in the academic arena due to their perceived ease of use and technological advances.

The fourth hypothesis examined the relationship between social influence and the usage of educational apps. The result indicated a positive association between social influence and the intention to use educational apps, which supports the findings of prior literature [16,33, 75,80]. Social pressure often triggers adopting new technology and innovations [99]. Apart from teachers, parents and peers, mass media also significantly influence the intention to use educational apps. Some education app companies are doing extensive media campaigning in India with film stars and celebrities to endorse their learning apps ([37], June 11).

Hypothesis H5, H6 and H7 examined the relationship between technological gratifications, i.e. novelty, activity and engagement and the intention to use educational apps. The result indicated an insignificant relationship. In U&G 2.0, Sundar & Limperos [108] suggest that technological affordances such as smartphones and tablets have created new gratifications that have paved the way for novel, interactive and engaging media experiences. However, this study result indicates that novelty, interactivity and engagement are not positive predictors of adopting educational apps. This could probably be because users find it difficult to adapt to this new learning method [30]. In addition, the COVID-19 outbreak forced many students who are not regular educational apps users to migrate to app-based education [63]. Also, the small screen size of the tablets and mobile phones could be another potential reason for the insignificance of technological gratifications. Larger screens have offered more attention and more content absorption than small screens like smartphones and tablets [69,72].

Finally, the current study revealed that gender moderates the relationship between U&Gs and the intention to use educational apps. The results showed that male students intention to use educational apps was more influenced by academic assistance and social influence gratifications. One of the main reasons behind these findings is the gender difference in the usage patterns of mobile phones and tablets. In Indian society, male students get more privileges and access to smartphones much earlier than girls [78].

6. Contributions, limitations and concluding remarks

6.1. Theoretical contributions

The current research findings have many theoretical contributions. First, the study extended the Uses and gratification theory beyond the conventional media to capture the motivations for using educational apps. The U&G is the most popular and widely used theory to study media usage behaviour and antecedents. However, we have given a new perspective to this theory by utilising it to test the educational app usage intention. We have also statistically tested and validated a model using new measures of education app usage. The developed gratification measures can help the academic community conduct further in-depth research on educational apps.

Second, the study identified three technological gratifications for using educational apps: novelty, activity, and engagement. Thus, this study has validated Sundar & Limperos [108] argument that new technologies have given rise to newer affordances and, in turn, has created new gratifications. However, the study result showed that the new gratifications were not significant predictors of the intention to use educational apps.

Third, we have used the mixed-method approach and proved a sophisticated research method to tap the U&Gs of new and emerging media [110]. Further, this research reaffirms the potential of the mixed-method approach and grounded theory [26,45] in analysing new technologies. The mixed-method approach is the easiest and most parsimonious research method to study new media behaviours of vastly diverse populations.

Fourth, this study identified the moderating effect of gender in the usage intention of educational apps. Thus the current study corroborates past U&Gs research [1,120] that females are lesser competent in adopting new education technologies. Albelali & Alaulamie [1] on internet-related technologies have identified the moderating role of gender. Also, this research upheld the popular argument [78] that in Indian society, boys get more privilege than girls in terms of technological affordances and accessibility.

Lastly, the study is conducted in a developing country, i.e. India, where limited research was conducted using U&G theoretical framework. Ruggiero (2000) argued that outside the United States, particularly in non-western countries, the U&G theory has limited acceptability. Nevertheless, our study negates this argument by extending U&G theory to study a new media, empirically testing and validating a model using new measures in a developing country outside the United States. Also, India is undergoing a massive transformation in digitalisation initiatives [110], and the sudden outbreak of the COVID-19 has created an increased demand for online education and educational apps. Hence the educational apps industry is expected to grow fast in the coming years. We hope that the current research results will contribute to the growing body of education app-related research and set the stage for further development in the U&G theory.

6.2. Practical implications

The current study has many practical implications as well. Firstly this study identified one of the key motivations behind using educational apps as academic assistance. Hence, we recommend that teachers and parents encourage students to use educational apps as the world is struggling under the clutches of the COVID-19 pandemic, and the education system is disrupted. Educational apps are an ideal alternative learning system that can compensate for the traditional classroom learning system at the time of the pandemic, particularly in developing countries like India.

Secondly, we found that convenience is one of the U&G that predicted the students' intention to use educational apps. Hence, we recommend that the education app designers and content creators develop convenient and easier solutions for students to comprehend

easily. Also, since app-based education is a more feasible alternative to mitigate the impasse created by COVID-19, complex disciplines like science and engineering can be taught using more interactive education apps. Students can read/watch/listen to the lectures and course materials anywhere anytime. If feedback and doubt clearing mechanisms are embedded in the educational apps, that can make distance learning more convenient.

Lastly, social influence gratification has emerged as the most significant predictor of the intention to use educational apps. That means the social pressure can create an ideal environment for the adoption of educational apps among students. Hence, the parents, teachers, and peers can influence the students to adopt and migrate to app-based learning. In India, to cope with the COVID-19 pandemic govt of India came with various free educational apps and portals to help the students learn from home. However, many students are unaware, and many have inhibition towards this new learning technology. Hence, based on our study, we suggest that teachers, parents, and peers can influence laggards [90] to use educational apps effectively.

6.3. Limitations and future research

Despite the number of contributions of this research, limitations also exist. First, although the current study has identified a comprehensive number of educational apps usage intentions, it may not be exhaustive. We recommend that future researchers expand the current study to tap more nuanced gratifications of educational apps. Second, data collection utilised a snowball sampling method hence. Although this can be justified against the backdrop of COVID-19, the sample has the inherent limitations of non-random sampling. Thus, based on our findings, we do not claim that generalisations can be made about the whole population. Third, this study is mainly based on education app users in India. Hence, caution must be taken while extending the findings to different cultures in different countries. We expect future researchers to conduct a similar study with a random sampling method in other cultures. Fourth, the current research only conducted a comparative analysis and investigated the relationship of a few antecedents of the intention to use. Hence future researchers can utilise a longitudinal approach to analyse the other constructs that influence the intention to use educational apps. Lastly, the present study examined the moderation effect of only one variable, i.e. gender. Many other demographical, technological, and social factors can moderate the intention to use educational apps. Hence, we recommend that future scholars consider a study from those angles.

Declaration of Competing Interest

The author declares that they have no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

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