Chapter 17
Intrinsic and Extrinsic Motivation for Online Teaching in COVID-19: Applications, Issues, and Solution

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Abstract Covid-19 has brought a challenging situation for the present education system. Online teaching adopted at various schools and colleges as a means to impart education to pupils has received a lot of confrontations not only by the students and parents who are at receiving end but also by the faculty who have utilized this method to continue the education program to enhance the learning of students. Adaptive analysis has been conducted on the present online education teaching involving various parameters. Regular teaching practices followed through online classes are not able to engage students to the best of their abilities so they need to incorporate fun-based learning methods. The online gamified education system is proposed to enhance the various intrinsic and extrinsic motivational factors which are directly proportional to high student engagement. Gamification acts as a strategy for the uplift contribution of members involved in online social communities. Gamified online learning is completely different from game-based learning. Gamified online education involves various elements of games, but the concepts of gamified learning include game-based learning, point-based system, virtual rewards, and high interaction among students by involving various gamified elements and mechanics.

Keywords Intrinsic motivation · Extrinsic motivation · Engagement · Game · Gamification · Online education system
17.1 Introduction

From March 2020 onwards according to UNESCO, 16,777 million students and children from 100 different countries are not attending their educational institutes due to the pandemic caused by COVID-19 [1]. It has been decided to close schools, colleges, and educational institutes nationwide, and University Grants Commission (UGC) has advised teachers and students to utilize this time to generate productive learning outcomes through online classes. The online education system is presently being adopted on a large scale by schools colleges and universities in India. Today’s generation students are very much well versed with the latest technology, and the online teaching method is not new to them, but more hands-on experience related to software or technology at the beginning of any course can make them feel more persistent in the course [2]. Firstly, there should be structured online teaching in which the first-course instructor should make the students comfortable with various modes of platforms that will be used to provide the information, and secondly, there should be the existence of technical assistant to handle online technical issues to help the instructor as well as students if they face any technical issues during the session.

**Problem identification** It is a great matter of concern to enhance the student engagement and learning outcomes when the gamified online education system is implemented. While attending online classes if there is a lack of interest, trivial discussions, and low participation rate, it all leads to low student engagement. Self-determination theory plays a very important role which includes various intrinsic and extrinsic levels of motivation that are concerning student engagement for online classes [3].

**Motivation** To enhance the various factors of motivation, the concept of gamified online learning is introduced [4]. The gamified framework for the online education system involves the various mechanics, dynamics, and components that focus on augmenting student overall learning. Gamification acts as a strategy for the uplift contribution of members involved in online social communities. Gamification is defined as changing the non-gaming environment into the gaming environment. A situation where the whole world is struggling with unwanted pandemic, there needs to have intrinsic motivation among students to engage themselves maximum in the online classes scheduled for students. Regular teaching practices followed through online classes are not able to engage students to the best of their abilities so they need to incorporate fun-based learning methods.

**Critical survey-based contribution** In this chapter, we discussed various elements of teaching that should be implemented in e-learning to make the online classroom more interactive and inquiry-based; students should be allowed to explore by giving adequate tasks and assignments. Online classes not only will act as a medium of imparting education but also will lead to many more explorations in terms of modern teaching. The concept of gamified online education can bring new
excitement among the students to explore various activities. In my previous research related to the gamified education system, remarkable results were shown by the students in terms of engagement and enhancement in learning in comparison to regular teaching. The involvement of various game design elements like points, badges, levels, challenges, feedback, leader boards, and avatars enriches user motivation, engagement, and learning experience. The major objective of gamified online learning is making monotonous online sessions more interesting and interactive. The concept of flipped classroom learning can make the online education system a new outlook in which the complete session will be based on discussion rather than a lecture-oriented session. Gamified online learning is completely different from game-based learning. Gamified online education involves various elements of games, but the concepts of gamified learning are completely designed to create a sense of gratification and comfort of learning through the new medium by exploring new methodologies involved to make the student more engaged. To make the learning goal-oriented and enhance student engagement through online teaching, there is a need to emphasize various activities which include planning, monitoring, and implementation of well-defined levels or strategies [2]. There is a need to identify various motivational beliefs and student’s direct, behavioral attitudes toward online learning [5].

**Article Structure** This structure of the article is as follows: Some of the imperative work related to gamification, that is, game-based learning, is mentioned in Sect. 17.2. The online learning system and various motivational factors are discussed in Sect. 17.3. Section 17.4 consists of a gamified online education system that is different from the present online education system. At last, Sect. 17.5 consists of an analysis report in which various parameters of present online education are analyzed.

### 17.2 Literature Review

Gamification is defined as “simple gameplay to support productive interaction for the expected type of learners and instructors.” In this heuristic definition, gamification is proposed as gamification of learning to assist gameful design. Gamification should upkeep creative interaction for expected instructors and learners [6]. With the use of gamification, the learning environment becomes more active, and it certifies that present users are doing, not merely watching. The concept of designing an interactive learning environment in the form of a generic virtual lab is a new concept used to enhance engagement. With the help of generic virtual lab architecture, instructors can work on experiments in their field. This is based on a fixed set of concepts related to the machine. The finite set machine is defined as a behavior model that is composed of a fixed number of states and transitions [7]. Internet-based learning is considered as a promising factor with qualitative learning outcomes. Electronic media and information available online are a fairly new approach to be used in health professions. The concept of gamification is implemented within
Internet-based learning to promote engagement and motivation for better learning experiences in health professions [8]. It is important that while providing a gamified solution to a problem, maximum user engagement must be achieved. This can be measured with game analytics. Designers must understand what motivates users and how different game elements may be combined to achieve this result [9]. Grades are emerged as valued contributors to rate student’s performance in class. It has been analyzed the fact that they are negative contributors to students’ engagement and behavior in class. So instead of assigning grades to the students, they have proposed to assign experience points. Students earn points for several activities related to ethical analysis. Students have the freedom to earn extra points also by performing extra activities. Freedom to earn extra points has also helped to gain their scoring momentum back as this was not available with the traditional grading system [10]. E-learning requires students to be more active, passionate, and motivated to grasp things easily. The author has tried to analyze the fact that does gamification increase engagement and learning capability for Internet-based content. Students’ quantitative interaction was also considered an important part of this evaluation, and it was found that gamification played a significant role when it was introduced in e-learning [11]. Emotions contribute significantly to the learning process. The intensity and role of emotions are analyzed when players from different backgrounds are involved in-game. It was observed that traditional games have a strong impact on the emotions of players. Psychomotor, cooperative, opposition, and cooperative opposition games were used for identifying the emotional intensity of users [12]. To increase the engagement and motivation of students in game playing, one should determine the interest of students by taking their preferences based on different parameters [13]. Didactic and pedagogical concepts are preferred among a wide range of various well-developed fields of game applications. Like teachers, parents are also trying to identify good educational games for interactive learning; the authors also state that a three-level metadata format may be developed for the elaboration of serious gaming [14]. Computer games help in developing problem-solving and logical thinking in players. Games are also considered as a prime factor of motivation and user engagement. They also constitute rules as per gaming constraints. Games can be used as a valuable contributor to gaining extensive learning during educational deployments [15]. Table 17.1 demonstrates the difference between games and gamification. Games are always considered as motivational factors for all age groups. Various scenarios have been explored where gamification may take lead in early childhood education. In early childhood education, a firm definition of play may carry certain descriptors like intrinsic motivation, process-based focus, etc. The analysis of motivational factors done by them has resulted in positive outcomes after considering them for an early childhood education environment [17]. The framework has been created for examining the effects of gamification by identifying motivational affordances associated with it. It was identified that the effect of gamification lies in the fact which is based on the users using it and on the environment in which it is being used.

The gamification concept can be formulated with the help of motivational affordance, psychological outcomes, and behavioral outcomes. Measurement of the
effectiveness of gamification was also varied from motivational to psychological outcomes [18]. The gamified learning system called reflex is developed. It presents a 3D virtual world in a browser that helps the user to enhance his learning and give his feedback. Based on the concept of gamification design, reflex can predict learner behavior during interaction [19]. Cloud computing has been used to share resources to reduce the operational costs, but it requires engaged users. The gamification is a method to enhance the motivation and positive attitude toward the routine activities. Gamification may be considered a potential means to achieve this mechanism. The study has been done to bind the relationship between game mechanics and cloud computing volunteers so that it can be used more generically [20]. Learn2Mine supports a cloud-based environment for teaching purposes. Its architecture can be effectively used in teaching as well as in taking a formative assessment of data mining concepts. Student feedback was also taken on the completion of course. It was observed that students were very positive in using Learn2Mine for the teaching of data mining concepts. Constructive feedback was also collected to improvise the proposed system [21]. User involvement is a very critical element of e-learning systems. Less user involvement signifies the fact that the traffic is being diverted on another system. Autonomy, competence, and relatedness are considered as mandatory social needs to be fulfilled to support user engagement. Identification of the main objective and deployment of game mechanics must be done for increasing the effectiveness of the gamified learning process. It can be used as a tool to reach user experience goals for increased user engagements [22]. Web technologies are playing an important role in improving learning methodologies, whereas motivation and engagement are primary for the completion of any task [23]. Intrinsic motivation comes from within it is more self-determining and self-competent, whereas extrinsic motivation is surrounded by various factors like results, rewards, punishment, to meet someone else expectations, etc. [3]. There are several ramifications in terms of online instructors, researchers, and course designers for the successful implementation of online courses [2]. One of the innovative online assessment methods which got the attention of educators is online peer assessment. Intrinsic motivation engages the student in online assessment to increase its self-efficiency, whereas in extrinsic

| Table 17.1 Comparison between game and gamification |
|-----------------------------------------------------|
| Game | Gamification |
| In games, predefined rules and objectives are used | May just be a collection of tasks associated with points/levels/badges or some form of reward |
| There exists a probability of losing | The concept of gamification is directly related to motivation so losing may or may not be the outcome [16] |
| Sometimes just playing the game is intrinsically rewarding | Being intrinsically rewarding is optional |
| The implementation of games is normally hard and expensive to build | Gamification is usually cheaper and easy to implement |
| The morphing of content takes place to fit the story and scenes of the game | Usually, a game like topographies is included without making too many changes to your content |
motivation, student involves himself in online assessment to get good grades and appreciation from faculty or to avoid any negative feedback [24].

17.3 Online Education Systems

As there is a rapid growth in terms of information and communication technology, even academic institutions are revolutionized, and there is a need to teach through different online platforms. Education has gone beyond classroom teaching, and the latest tools used for information technology help to provide education to school students, institutions, and universities in any part of the world. One of the best innovations in terms of communication technology and information is the Internet [25]. During this pandemic of COVID-19, online education is only possible due to the availability of the Internet. One of the major concerns in online education is online technology experience because it is very important to estimate how experienced are you with the latest technologies in terms of web browsers, installing various online applications used for online teaching platforms, surfing the Internet, and many more [5]. Online learning involves relatively more commitment, self-regulation, and willingness to learn a particular course or topic. Online teaching can only be successful where there are lively contribution and involvement of students [26]. The increased use of online learning strategy incorporating various interesting methodologies can surely help to achieve better results and enhance student satisfaction and can witness good progress in terms of engagement [27]. For effective online learning, the primary component is student engagement which is directly proportional to student’s academic performance [16]. Student engagement is a construct of several subsets; each subset has its indicators. The online learning environment is highly autonomous, but it creates a hindrance for those who lack self-regulated and motivational skills [5]. Self-regulated learners are the active participants who effectively utilize all the possible resources and establish a productive work environment to enhance their learning skills. Web technologies are playing an important role in improving learning methodologies, whereas motivation and engagement are primary for the completion of any task. Any deficiency in any of the above properties may lead to distraction. The collaborative platform based on smartphone application for the preparation of official examinations helps students to test their knowledge and also users send their feedback [23].

The complete model of online education is represented in Fig. 17.1 which demonstrates the relationship as \( n \) ratio 1 (students–teacher) which is connected through the cloud and is using various adaptive learning and style acquisition to perform the teaching successfully. Various applications like Zoom, Google meet, LPU live, and specific school/university management systems are acting as lecture delivery platforms to overcome the gap of physical classrooms. These various learning environments help to connect with students and provide them all the necessary learnings in the form of lectures, online materials, and e-books to keep the students engaged. Students are connected to the interface by using various hardware mediums such as
mobiles, laptops, desktops, etc. In the traditional education system, smartphones/tabs were never part of our learning, but the current situation is completely reverse, and various mobile applications are involved in the classroom learning to make the lectures more user interactive and effective.

### 17.3.1 Motivational Factors

Students need to focus on three parameters which include curiosity to achieve the goal, self-efficacy, and self-regulation [2]. Intrinsic or extrinsic motivation influences student engagement in a particular task [2]. The factors which include curiosity or interest can be termed under intrinsic motivation. The student wants to explore its capabilities and adopts the natural tendency to perform the challenges and achieve the best results without any external incentives. On the contrary, if we talk about extrinsic motivation, the students tend to perform to achieve its end-stage and along with its results, grades, appreciation, or punishment are attached to the task [2]. The high motivational level of students directly leads to an increase in engagement, and enhancement in learning takes place [28]. Low motivational levels presented by students degrade the student learning capabilities and result in a lack of interest [27].

![Fig. 17.1 Online education system](image-url)
17.3.1.1 Intrinsic Motivational Factors

Online video tutorials: Availability of online video tutorials plays a very prominent role in the world of education; this new learning method helps to improve student capabilities and competencies [25]. These videos can be viewed by the student at his own pace of time and can be viewed as many times as necessary until the student grasps the particular topic. This helps a lot of students who might have any technical issues during classroom learning or want to revise the topic independently. Instructors should make full use of vast multimedia material available to make the student learning more innovative and understandable.

Feedbacks/interactive learning: There exist four key principles of online learning which involve encouraging student interaction, understandable topic explanation, collaborative learning, and feedback [25]. If the student is free to ask the question through online chat or during the class, then there exists a sense of community and collaboration among students, and also they feel inherently motivated to be connected through virtual environment [26]. Emotional engagement plays a vital role in which positive feedback from an instructor, as well as students, creates a good learning environment [16].

Fun-based learning: Various game elements can be incorporated to make the lecture more interesting and fun-based [16]. Students can be also involved in a multiplayer online game-based task which can enhance their learning skills through collaborative learning behavior; collective enjoyment can be achieved by completing the task as a team [29]. To attain common goal, students can share common applications, that is, content resources which enhance informal learning abilities.

17.3.1.2 Extrinsic Motivational Factors

Attendance: In the education system, the accountability of teachers and students is always considered very important. Students are supposed to maintain a specific percentage of attendance depending upon their school/university regulations. Based on good attendance percentage, they are assigned a few bonus marks and regular attendance badges, nominated for class representatives, etc. The students who have low attendance are not allowed to appear in final exams or maybe not promoted to their next semester or grade.

Rewards: Students feel motivated by receiving rewards; it may be in terms of good marks, grades, or virtual gifts [30]. It is believed that extrinsic rewards act as the important motivational factor which is much liked by the students [31].

Fulfilling the expectations of parents/teachers: Expectations of parents and teachers play a very critical role in the student’s academic performance. It has been analyzed when parents/teachers hold high expectations from students they perform better and get higher grades; it provides them with a positive and challenging environment to prove their ability [32].
17.4 Gamified Online Education System

The gamified approach has a high prospective to enhance learning and engagement among the students [28]. Gamification elements should be used extensively to increase user engagement and user participation in assigned tasks. Gamification primarily focuses on extrinsic motivation. Commonly used game elements include achievement, behavioral contrast, fixed interval reward schedules, and loyalty. Gamification is being used in almost all areas these days. Gamification provides motivational playful experiences through the use of interactive technologies. They have been applied commonly in operational tasks [33]. Student response systems are becoming popular these days. It is of immense benefit that instructors can get instant feedback from students which may not be available with traditional systems. The use of gamification to improve student learning in class results in improved user engagement and motivation. The game elements involved in the process of gamified online learning should be meaningful and interesting for students to achieve their learning goals [28]. The implementation of the online gamified forum was more fun and interesting in comparison to the traditional online discussion platform [16]. It was indicated by students that leader boards act as a motivational component and influence to perform with the best of the abilities and capabilities to sustain the name as top achievers [16]. The concept of gamification does not require a full-fledged game design platform, but it works on simple gameplay methodology which can be implemented without any major constraints [6]. To implement gamified learning, no specific tool is required on critical system thinking, and adequate use of game mechanics/elements can lead to a high level of engagement (Table 17.2).

17.4.1 Online Education Gamified Framework

**Target behavior** Intrinsically motivated students showed the active participation during the online classes. The framework designed to enhance intrinsic motivation among students comprises various factors such as prompt availability of information [34], compassionate learning environment, social engagement of students, and instructor. Having the right set of educational online platform, educators, teachers, etc. can streamline online teaching to be more effective and engaged.

**Players** Students, teachers, parents, technical support system

**Game elements** Points, virtual rewards, badges, leader boards, positive feedback

**Points** Points are assigned to the completion of a particular task [30]. In online education, system faculty can assign points to students on completing the assignment on time, creative tasks, answering questions while having online classroom discussions, and many more according to the subject and faculty requirements. This
makes the students more engaged, and interactive point-based learning can enhance student participation during online classes which seems to be low according to the analysis done. Normally, students’ performance is only judged through exams that are also on a weekly or monthly basis, but to involve students on regular basis, the point-based system can enhance their productivity and also improve their monthly test performance.

**Badges** On completion of specific tasks, the weekly or monthly badges can be assigned to students [35]. We can assign badges through credly.com to students for the best performer, keen observer, best attendance, creative task, etc. Also, we can design our badges and assign them to students which motivate them to perform with their best capability and ability. Badges assigned to students are used as status symbols or credentials to display on various social networking platforms.

**Leader board** A leader board acts as a medium used for featuring a comparison of students and displaying their credibility and performance to the whole class daily [34]. The names displayed online screen will vary daily with the presence of virtual points, badges, and marks gained by students in their respective tasks.

### 17.5 Research Methodology

To have a clear outlook on the present online education system during the COVID-19 situation, a survey is conducted through Google forms. The survey is used to collect data on various parameters which include the intention to understand whether online classes are useful for students, analyze various motivational factors, and can deal with all technical challenges. Analysis of data can help us to find loop pools in the present online education system and suggest better engaged, motivated, and creative online classroom learning.

| Comparison points | Online classes | Gamified online classes |
|-------------------|----------------|------------------------|
| Environment       | Structured environment | Game-based learning environment |
| Teaching methodology | One way the teaching process | Two-way teaching process (point-based interactive learning) |
| Challenges        | Assignments, online quiz | Game-based activities, group discussions, creative tasks allotted to students, open-book tests |
| Rewards           | Students are assessed through marks/grades | Reward mechanism, assign weekly badges, leader board performance meter |
17.5.1 Data Collection and Respondents

The survey form is shared with various school faculties to share with students and parents to give their reviews on online classroom teaching. In this situation, parents are also playing an important role in helping their students to deal with online classes so the survey is not only to be filled by students but even parents can fill the survey form. The public platform like Facebook and Instagram is for the collection of data.

17.5.2 Research Questions

It is necessary to understand fissures in the present online education system to understand where our system lacks and what newly proposed mechanism can be designed to have more effective, motivated, and engaged online teaching. The corresponding questions cover the wide aspect of intrinsic and extrinsic factors that are part of effecting learning and teaching parameters.

| Research questions                                                                 |
|-----------------------------------------------------------------------------------|
| RQ1 Online classes are a good way of imparting education to students               |
| RQ2 Teaching approach followed during online classes is interactive               |
| RQ3 During online classes, do you feel comfortable in asking doubts?              |
| RQ4 Online classroom teaching motivates you to learn new concepts                 |
| RQ5 Do you face any technical issues during online classes related to software, laptop/desktop issues? |
| RQ6 Is there a need to improve the present online education system?                |
| RQ7 Does school/college authorities help you deal with technical issues?           |
| RQ8 Are you able to create a classroom bonding with your peer mates and faculties?|
| RQ9 Do you think online classes should continue even after school reopens?        |
| RQ10 Are the students comfortable to take classes without the subscribed books?   |
| RQ11 Which online education learning source is considered as the easiest to use?   |
| RQ12 During online classes, have you faced any issues with the Internet connections?|
| RQ13 Do video lectures prepared by teachers easily comprehended by the students?   |
| RQ14 Rate the present online education system                                     |
| RQ15 Do you think the moral values which are an important part of student education can be imparted through the online education system? |
| RQ16 Is there a need to motivate students to enhance their learning through online classes? |
| RQ17 Sufficient online material in the form of PPTs or video lectures is provided to students |
| RQ18 Are you involved in any fun-based activity or game-based quizzes during online learning? |
| RQ19 Students are awarded with any virtual rewards or badges to enhance motivation levels |
| RQ20 Students attend online classes to fulfill attendance constraints               |

(continued)
17.5.3 Performance Analysis

A total of 166 responses have been received in the survey done for the online education system. In addition to responses, 15% of students belong to primary section (class 1–5), 42.5% of students belong to secondary section (class 6–10), 24% of students belong to senior secondary (class 11–12), and 18% of students belong to college/university level. The participation percentage of girls is 53.9% and boys 46.1%.

17.5.3.1 Reliability Test on Data Set

The method used to check the reliability of data is Cronbach’s alpha method; it helps in the validation of data which is collected through the survey. The data consistency and acceptance of data are checked through this method. The spss software is used, and steps applied are demonstrated in Fig. 17.2.

Table 17.3 exhibits the data collected is valid and no inconsistent value is found. Table 17.4 defines the Cronbach’s alpha value which is and if it is greater than 6 which demonstrates the collected data has good internal consistency.

17.5.3.2 Results of the Questionnaire

A primary survey has been conducted concerning the online education system; on behalf of inputs given by parents and students, the results are represented in the form of graphs. The inputs are taken on linear scale 1 = “Strongly disagree,” 2 = “Disagree,” 3 = “Neutral,” 4 = “Agree,” and 5 = “Strongly Agree.”

During this pandemic situation, educational settings should continue, and students should be provided with the opportunity to learn, grow, and increase their knowledge under a safe and caring community. As the lockdown situation exists, students cannot go out. Rather, they need to have a fixed routine in which they are well-disciplined and engaged. Students and parents have widely accepted the online education system as in Fig. 17.3 around 21% of people result in disagree or strongly disagree rest, whereas 46.4% of students and parents agree that online education is a good way of imparting education to students and keeping them engaged through classroom learning. However, Figs. 17.4 and 17.5 demonstrate that there is a need to bring a few modifications in the present online education system. As this situation was so unpredictable that schools/universities, teachers, and students were not prepared, there exists a wide scope of improvement. Nearly 79% of students/parents

![Fig. 17.2 Steps followed to check data reliability in spss software](image-url)
believe that in this era of technology online education system should make the students more engaged, and enticement factors should be improved.

Figures 17.6 and 17.7 inculcate there exist interaction and doubt clearing sessions during online classes. To enhance learning, there is a need for maximum participation and student interaction that is most desirable and sensible to solve any particular problem. As in online classes, the eye-to-eye contact between student and teacher does not exist; thus, it is difficult at the faculty end to identify the students who have understood the concept or not. Hence, students need to interact and formulate collaborative learning. Faculties need to opt for various gamified methods to enhance the student–teacher interaction for high productive results.

Various activities can help the students gain moral values, respect, hard work, compassion, and cooperation; forgiveness does not require any specific platform; these ethics can be taught to students through different home-based practical assignments. Figure 17.8 shows more than 50% of students do not agree that moral education can be imparted through online classes. There is a need to enhance collaborative learning which indirectly also inculcates moral values like listening to your friends and group work, managing time, dividing tasks, etc. As Fig. 17.9 clearly states, there is less collaboration among students during online classroom learning so there is a need to involve students in various group activities and fun-based learning

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**Table 17.3** Case processing summary

| Cases | N  | %    |
|-------|----|------|
| Valid | 166| 100.0|
| Excluded* | 0 | 0.0  |
| Total | 166| 100.0|

*Listwise deletion based on all variables in the procedure

**Table 17.4** Reliability statistics

| Cronbach’s alpha | N of items |
|------------------|------------|
| 0.878            | 17         |

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**Fig. 17.3** Survey result of imparting education
sessions. Collaboration among the students will directly lead to imparting various moral values among students.

Various digital platforms are used to conduct online classes, and Fig. 17.10 depicts more than 50% of students are using smartphones which are being used as
an effective learning tool; it provides the opportunity to learners to access various online learning platforms and interact digitally. Many drastic changes have taken place in the education sector in the last 2 months: mobiles were never part of classroom learning, but now learning is only possible with the help of smartphones/tabs/laptops.

The transition from traditional classroom learning to virtual classroom creates a lot of challenges in technical aspects which include issues related to software, hardware, and connectivity issues. Figures 17.11 and 17.12 demonstrate that more than 50% of students have faced high technical issues and 72.9% of students have faced the Internet connectivity issues. For online learning, there is a requirement of high bandwidth and a strong Internet connection and one of the major constraints is nothing was well-planned. For the smooth conduct of online learning, technological proficiency is a must to both ends: the student and the teacher. Technical support provided by schools as mentioned in Fig. 17.13 has helped the students to participate in online learning with fewer interruptions. Sessions can be conducted with students or parents to deal with technical, software, and hardware issues for effective online learning.
Books have been an integral part of our education system as the new session in schools starts in April school students are deprived of their textbooks. Figures 17.14 and 17.15 show a high percentage of students who agree that online material...
provided to students in the form of ppt, video lectures, and etc. is readily understandable and effective. However, Fig. 17.16 depicts around 42% of students/parents believe students are not comfortable with the availability of manual textbooks. Due to drastic changes in the education system, student and teachers have involved the technology tools to make sure learning remains a continuous process. Students have adopted online classes; Fig. 17.17 states around 50% of students are motivated to learn through virtual classes. However, there is a major requirement to boost and motivate students and make a shift from 50% to 100% by enhancing motivation among students for online classes. Figure 17.18 shows a matter of concern that more than 60% of parents/students feel that there is a need to enhance the motivation factors among the students. Motivation among students can be enhanced intrinsic and extrinsic factors discussed in Sect. 17.3. Game-based activities act as one of the important factors of intrinsic motivation. Various methodologies can be incorporated to make the classes more interesting and engaged. Still, the percentage of game-based learning is less than 45 as shown in Fig. 17.19; it should be enhanced which directly leads to high motivation among students. Rewards, virtual gifts, and badges act as high motivational factors that need to be embedded in the present teaching environment to enhance student motivation and engagement during online classes. As is evident in Fig. 17.20, only 30% of students are involved in any such mechanism. The new teaching mechanism surely needs new teaching motivational factors to make students feel enticed through virtual classes. Forced attendance is one of the constraints for students to attend the classes; as in Fig. 17.21, more than 50% of students/parents believe in this. Forced attendance system can make students log in to the virtual class but with zero interest and low engagement among students. In Fig. 17.22, there are 38% of parents/students who strongly disagree to promote online classes once the situation of COVID-19 is under control. The system needs to be gamified and bring a revolutionary change in the education system so that even after the school reopens students should be connected with an online platform for one particular subject to know the latest technologies and explore in a versatile manner.
Fig. 17.13  Technical assistance

Fig. 17.14  Understanding of video lectures prepared by teachers

Fig. 17.15  Online material provided to students
Fig. 17.16  Online classes without the availability of books

Fig. 17.17  Online classes motivate students to learn new concepts

Fig. 17.18  Need to enhance motivation among students
17.6 Conclusion

Due to the pandemic COVID-19, transition has taken place from traditional learning to virtual learning. Learning environments help to connect with students and provide them all the necessary learnings in the form of lectures, online materials, and e-books.
to keep the students engaged. According to our analysis, students have widely accepted the construct of the online education system, but there is a need to enhance various motivation levels to make the student more engaged and enticed. Mobile-based learning has become an important part of online learning and has a remarkable future to be part of our traditional education system in the future. To avail the maximum benefit of the online education system, there is a need to create a properly structured environment that is beyond the video lectures or replication of physical class. Furthermore, there is a need to incorporate new engagement methodologies that promote student involvement and high interaction among online classes and increases their knowledge. Implementation of gamified online education can bring a revolutionary change in the education systems. The various game elements which include point bases systems, rewards in the form of badges, and virtual gifts can have a high prospective to enhance learning and engagement among the students. In the future, mobile-based learning can be considered as an important component.

17.7 Future Scope

E-learning surely has a bright future in the education system. Enhancing the engagement factors and including various concepts of virtual reality, augmented reality solutions, and skill-based learning can bring a revolutionary shift from traditional learning to the online education system. Once this pandemic situation of COVID-19 is over, then also school universities should continue with online classes at least once a week to make the students aware of various technological assets and allow them to explore various parameters involved in the online education system.
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