

Article

A Framework for a Seamless Transformation to Online Education

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Abstract: Online education is now widely used in schools and universities as a result of COVID-19. More than 1.6 billion children, or 80% of all school-aged children worldwide, have missed school as a result of the COVID-19 pandemic. The COVID-19 outbreak has been a significant concern for educational institutions since 2020 and has interfered with regular academic and evaluation practices. Organizational preparedness for online education must be assessed by institutions. To assist them, we present a case study carried out at an Indian educational institution that highlights the drawbacks and advantages of online education and that outlines a framework for its change. Additionally, we assessed the system and offered suggestions to improve the online instruction provided by institutions. We think that the proposed methodology will assist organizations in identifying challenges prior to launching online learning.

Keywords: online education; blended learning; e-learning; educational institutions; digital education



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1. Introduction

Teachers have always experimented with their craft in their efforts to be more effective. Through the adoption of new ideologies, strategies, techniques, resources, and technologies, teaching has advanced over the years to reach a larger audience. As technology changes, teachers must carefully use, evaluate, and adapt new tools to make the most of them and to determine how they work.

In higher education, online learning is well established [1]. The advantages of online education are well-known and include improved access, more flexible scheduling options, fewer space requirements, and lower delivery costs [2–4]. Additionally, there is a need for precise instructions and obligations, honest and open communication, the presence of both the students and the instructor, and prompt feedback [5–8]. When both students and teachers feel at ease, communities can begin to form [2,4,9].

The effects of the global COVID-19 pandemic have had a considerable impact on how higher education institutions currently provide their educational services. Students and educators from all study disciplines and levels were required to switch to online teaching, learning, and evaluation techniques immediately in order to be in accordance with national lockdown limitations. Work–life balance and welfare were severely impacted by this abrupt end to face-to-face learning, and many students and employees reported feeling particularly lonely and cut off from their friends and co-workers, who they had been interacting with regularly before the outbreak. Online learning can be defined as education carried out through the use of digital tools that are used to instruct others online.

All student groups, including mature students, commuters, disabled students, and those with mobility challenges, medical conditions, and care obligations, have experienced the benefits of online learning in terms of engagement, motivation, enjoyment, and satisfaction. It is well known that students prefer online instructors who are kind, sympathetic,

approachable, upbeat, comfortable with technology, and who regularly give them opportunities to interact, collaborate, and form relationships with other students. This confirms that staff members still have a crucial role to play in facilitating student learning in online contexts.

Online learning has grown significantly over the past several years thanks to information and communication technology (ICT). Online learning has some advantages over more conventional offline education. By offering students personalized guidance and immediate feedback, online learning can, in the beginning, make the learning process more student-centered. Second, because online education is affordable, more people can more easily access high-quality education. Third, access to online education is simple. It provides more learning opportunities for people who reside in rural and distant areas where there may be few local educational resources. Given the benefits of online learning, techno-optimists think that its widespread use has the ability to raise educational standards and spread equality throughout the industry.

Due to the COVID-19 epidemic, online education has mostly replaced traditional education at all levels of learning, from elementary schools to colleges and universities. For close to 80% of the world's enrolled pupils, the COVID-19 pandemic has forced more than 1.6 billion students to stay home from school in 161 nations, causing them to miss out on normal class lectures and other academic activities [10]. The COVID-19 epidemic became a major problem for educational institutions starting in the beginning of 2020 and has severely limited their ability to carry out their regular academic and evaluation activities.

Digital tools and technologies are creatively used in online education for learning, assessment, and teaching. Online education is often referred to as TEL (technology-enhanced learning) or e-learning [11] and was enforced by the regulating bodies of educational institutions in every nation in order for students to stay safe while continuing their academic activities via online learning in the absence of a vaccination to reduce the rate of COVID-19 transmission. Educational institutions in nearly all of the world's nations have begun to transition their methods for holding lectures, assignments, seminars, and exams to online platforms. As a result, the system's resilience was placed under more stress, and both instructors and pupils had to learn how to use online platforms rapidly.

In spite of some faculty members and organizations having previously adopted online learning and being familiar with it, it was not until recently, as a result of the COVID-19 crisis, that a large number of people began using platforms for online learning and began to enjoy both the challenges and advantages that come with it. In fact, most institutions were compelled to change to an online learning environment overnight without any kind of planning, which may be why we are now hearing about "digital flops" [12–15].

To adopt online education successfully, educational institutions must evaluate their "organizational preparedness". Here, we use a case study carried out at an Indian educational institution to highlight the advantages and drawbacks of online education, and we create a prospective framework for its transformation to aid institutions in their endeavors. As part of our review of the framework, we also conducted a preliminary assessment. Below, we provide our recommendations for institutions that are looking to offer students efficient and worthwhile online education. We think this approach will help educational institutions figure out their problems with online education before switching to online learning.

2. Review of Literature

Public life was severely constrained to slow the rate of COVID-19 infection in 2020. The majority of courses became digital, and all university facilities were unavailable to the general public. The term "emergency online learning" [16] refers to a moment in contemporary history in which the whole student population began to learn exclusively from home for a protracted period. Assuring the availability of all required courses inside study programs was the priority to keep the show going. However, now that we have completed over a year of emergency online learning, we can examine the many COVID-19 crisis-related activities as well as teaching strategies in more details from the perspectives of

an online course for higher education professionals [17], of problem-based online learning, or by considering online learning methods that had been used before but that changed due to the real-world scenario (for example, statistics on the use of online learning in the past tense situations). Numerous educators and students were caught off guard when the transition from in-person to online learning happened virtually overnight.

It is reasonable to assume that teachers' knowledge, proficiency, and attitudes toward using digital technology to provide worthwhile learning experiences for their pupils will be influenced by a variety of other factors [18]. Numerous studies have shown that university teachers still mostly avoid utilizing digital techniques to provide online learning opportunities that are more than just digital slide presentations, and instructors usually lack the essential skills (e.g., [19,20]). In a similar vein, managing online education programs that are entirely online requires students to have the ability to self-regulate themselves and their learning strategies more than before.

When regular classroom meetings and teacher-directed direct external regulation are not organized, student learning is more dependent on metacognitive strategies and internal and external resource-related methods that help them to observe, organize, and regulate their learning methods in a goal-oriented manner [21,22]. Because online learning and digital skills go together so well, both teachers and students need fundamental technical skills to make the most of the opportunities that online learning offers.

The capacity to use digital techniques to find, manipulate, process, and produce data and information and the ability to communicate and collaborate with others online are all included in the category of digital skills [23]. The results of numerous large-scale examinations conducted internationally, on the other hand, suggest that the digital competence of secondary school teachers and pupils varies greatly [24,25].

It is logical to assume that as a result, the student body at higher education institutions will likewise be quite varied in terms of taking advantage of online learning and teaching. Indicators of the limitations within which online learning and teaching happens or does not occur may be found in the institutional, organizational, and administrative factors, with examples including infrastructure, digitalization policy, support systems, or equipment [20]. The research on this topic highlights both the range of contextual elements at play in the background and the variety of prospective ways in which online teaching and learning can be implemented.

3. Transformation to Online Education—Challenges and Advantages

Regarding their professional lives and work, faculty members across educational institutions are currently going through a transition period. The rapid shift to online forms of delivery to retain student engagement has resulted in drastically increased efforts for staff as they work to not only move instructional material and resources online but to also develop the necessary software navigation skills. Both instructors and students are affected differently. In some contexts, similar to many organizations, online and mixed delivery methods for courses are already well established; thus, increasing capacity along existing routes is now the responsibility. Due to the shift to the online environment, teachers in certain places are finding it very hard to adjust to what may be the "new normal" for a long time, especially in educational institutions.

During the past several years, a select number of educational establishments have begun to implement online education as part of their curricula. Worldwide, online education platforms such as Coursera and EdX have attracted a decent amount of acceptance. These programs have made it possible for educators to communicate with aspirational pupils located in different parts of the world. They have allowed educational organizations and individual instructors to not only conduct educational programs in a distance-learning format but have also allowed them to make a profit from doing so. For instance, the government of India created and promoted the online learning platform "National Programme on Technology Enhanced Learning (NPTEL)" in India, and in recent years, it has been determined to be quite popular among both professors and students. In India, the market

for online education is predicted to increase by an eight-fold proportion over the next five years, reaching USD 1.96 billion in sales and 9.6 million subscribers by 2021, as per the research by KPMG.

Consulting teams and researchers advise that not all of these schools have or can mobilize the necessary campus resources to accommodate a 30 to 50% surge in students choosing on-campus education over the next 10–15 years. Enrolling students in online courses is both a logical solution and a need to expand capacity when neither the government nor private organizations are providing financial support for the construction of new structures or laboratories or for the establishment of new educational institutions. This is yet another strong argument for many nations to support and develop online educational opportunities. As a result, educational establishments are powerless to do anything besides seek out non-traditional teaching methods, such as online education, to assist their students in comprehending the pedagogical instructions provided by their faculties and in participating in evaluation activities.

One of the key issues that such alternative efforts bring with them is the capacity of the stakeholders (students and faculty) to adjust to the new learning system and to organize training to utilize online learning systems such as Coursera, Edx, or any custom-built learner-management system. Although there are some financial and campus infrastructure benefits to adapting to online education [26], such alternative initiatives also bring significant challenges for institutions with them. These key challenges include the availability of the requisite IT infrastructure. We decided to carry out a study using the right method, which will be explained in the next few paragraphs, to determine the problems that educational institutions have to deal with.

4. Research Methodology

The survey-based research methodology suggested by the research methodologist Yin [27] was used in this research. It involves two stages. The steps provided by Yin [27] are (i) to prepare a draft of the interview questions as suggested in King and Horrock [28]; (ii) to carry out a pilot interview with two or three interviewees to verify and validate the correctness and completeness of the questionnaire; (iii) to conduct the actual interview with the chosen interviewees using the final questionnaire; and (iv) to use interview findings as a basis to develop the proposed framework.

King and Horrock's [28] qualitative "focused semi-structured" interviewing techniques were employed for data collection. By "focused," we mean that the participants' understandings of online teaching and learning activities were the main emphasis of the interview and any interactions with them. The word "semi-structured" in this context means that the participants were asked to react to questions that had been prepared in advance but that the interviewer had the freedom to add a few more questions on the spot to obtain more detailed information from the interviewees.

It should be noted that 32 professors over the age of 30 years old were chosen from eight different educational institutions and interviewed in the first round. In the second phase, we conducted a case study at a particular institution. During March and April of 2021, the case study and the interview were conducted entirely online through several platforms, including Google Meet. Three of the eight universities from which the academics were selected found that they were already using online platforms in some capacity, while the other four had never used such internet services and were likely utilizing them as a response to the limitations imposed by the circumstances of the COVID-19 outbreak. Based on what King and Horrock [28] have suggested, we carried out "focused semi-structured" qualitative interviews with the 32 academics. These academics were from eight universities, each of which contributed to 4 of the 32 professors overseeing the introduction of online learning at their institutions.

The academics were interviewed to determine the tactical, strategic, and operational facets of their institutions. All of the respondents were requested to provide further details regarding the preparations they took to adopt online education, their discussions with

faculty colleagues and students that take place along the way, the planning tools they utilize, and other technical issues and challenges. The responses of the interviewees were documented and evaluated so that decision-making patterns could be deduced from the collected data. All of the people who were interviewed stated that they had not implemented any structured or in-depth planning and execution processes, nor had they prepared any documents to record their ongoing activities related to online education, including their performance or any problems that may have arisen. Nevertheless, some documentation needs to be improved in terms of its usability and efficacy. According to the results of our study, to save time, all of these educational institutions have recently started offering online versions of classes that were previously only available on campus. However, these online versions are not very well organized and only have a few guided exercises to help students prepare.

We concluded from the interviews that these eight institutions were struggling because of inadequate IT resources, a lack of awareness of online tools, and a lack of planned decisions to either buy new online education tools or to update current tools or pilot test some of the free online available resources available for e-learning before purchasing. Based on the analysis of the interviewees' responses, we have found that for a learning organization to start online education effectively and efficiently, it is necessary them to possess three characteristics (criteria for capability assessments): the necessary IT infrastructure, faculty and student adoption of online services, and software packages made for online learning. We suggest a "Capability Assessment Framework (CAF)" that takes such things into account and that is explained in the next paragraph.

5. CAF (Capability Assessment Framework) for Online Education Implementation

An institution will be able to evaluate both its existing capabilities and its potential to successfully implement online education with the assistance of CAF, as illustrated in Figure 1. This will help educational institutions to decide if online learning can be carried out effectively.

Attributes	The capability of the Institution		
	No change (‘0’)	Gradual change (‘1’)	Radical Change (‘2’)
IT Infrastructure	A1	B1	C1
People	A2	B2	C2
Product	A3	B3	C3

Figure 1. CAF Framework.

Each of the framework's attributes—IT infrastructure, products, and people—are assessed concerning three different capability measures: radical change, no change, and gradual change. The institution will receive a score of "0" if it is unable to make any modifications or improvements for the attribute "IT infrastructure," a score of "1" if it can make some minor adjustments, and a score of "2" if it can afford to make large modifications or remarkable progress within a short amount of time. In this way, the capacity is measured for the other attribute "people." An OEMT ("Online education management tool") is given a score of "1" if it can help people accept and cope with minor changes, a score of "2" if it

can help people accept adjustments made by an OEMT at any time, and a score of “0” if the individuals in question cannot adapt to any changes.

The institution receives a score of “0” if it cannot manage to update its current product (OEMT), a score of “1” if it can be updated to meet current demands, and a score of “2” if it can afford to upgrade its current products or purchase new ones to satisfy the institution’s current needs for its teachers and students. Ideal scoring for an institution would be “2” for each of these three factors, giving them a total score of “6,” or C1-C2-C3. If the overall evaluation score in CAF is “0” (A1-A2-A3), then it is clear that educational institutions should either forgo offering online courses or think about only carrying out those that can be implemented with simpler resources.

The objective of the framework is to help the institution understand the strengths and the weaknesses with regard to the capability to get transformed to online education. As observed from the previous research studies, the significant parameters for this transformation are the Information Technology (IT) resources of the implementing institution, the IT team which will be involved in planning and executing this transformation and finally the IT product (i.e.,) the learning management system which is going to be used by the faculty and the students for online education. If all these parameters are taken into consideration by the implementing institution, then they would not face any hurdles during the post implementation.

The capability assessment decision framework is a collection of instruments and suggestions that provide direction and encourage the adoption of common standards for the conversion of institutions to online education. The CAF Framework, an instructional design model for creating and delivering online education that aims to alter behavior and improve performance, is based on a qualitative study carried out at an institution. It is also based on earlier research on online education, the principles of the blended learning model, and instructional design literature. It provides a methodical approach to needs analysis, designing, creating, and implementing online education through IT solutions, as well as assessing them in the context of people, IT products, and IT resources. The implementing institution is now given a streamlined, targeted approach by the framework, as well as feedback for ongoing progress.

6. Application of the Framework

To determine how practically applicable the suggested framework is, we carried out a case study at one of the eight universities. The case study research to analyze our proposed framework was conducted according to the strategy that was recommended by Yin [27]. The nature of our case study research can best be described as exploratory. The purpose of this project is two-fold: first, we wanted to demonstrate the usefulness of the framework by putting it to use in a real-world scenario so that we could communicate to the audience the kinds of outcomes that they might anticipate; second, we wanted to derive insights from the consequences of applying the framework. We arrived at the decision that the following procedures would be the best strategy to carry out the case study: the academics from the case study school would assist in data collection; second, we would make it easier for the case study participants to apply the framework by instructing them on how to assess their institutions’ assessment ratings for each characteristic; and third, we would analyze and summarize findings and recommendations. We came to this conclusion after deliberating on the matter.

The institution known by the pseudonym “GIST” hosted the case study, which was conducted at the beginning of March 2021. “GIST” has been around for more than 30 years, and it now provides a total of 16 different post-graduate degree programs in addition to 12 undergraduate degree programs. Every year, approximately 1500 students graduate, and this number represents the national average. The university has a total faculty of 290 people and is equipped with fundamental information technology resources, along with additional conveniences. Over the course of conducting this case study, we spoke virtually with a team of seven academics who were tasked with assisting their faculty members and students

while the institution under investigation implemented online education. They are highly experienced faculty members who have in-depth information regarding the development of teaching and learning procedures as well as of the evaluation system at their institution. They were acquainted with the aspects of the OEMT program that were used by their fellow staff members as well as with the methods in which their fellow staff members utilized online education platforms. During the current COVID-19 situation, which is still ongoing, we noticed that "GIST" was only beginning to become acquainted with the concept of online education.

Since February of 2020, the organization had been working with a freeware OEMT. The administration of this educational institution concluded that there was very little room for training to be provided to the institution's teachers and students; therefore, they decided to begin requiring them to utilize this instrument beginning in the last week of February 2020. To determine whether or not their institution was prepared to make a smooth transition to an online education platform, we asked those seven professors from the institution that served as our case study, GIST, to assign a point value to each of the CAF's features. Every professor was briefed on the significance of awarding a score for each attribute as well as the ramifications that this had. All seven academics were asked to meet in a single online venue, Google Meet, to debate the suggested framework known as CAF and to assign marks collectively and decisively for each of the following characteristics: the product, the IT infrastructure, and the people. The first writer was responsible for documenting all of the specifics of the conversations that took place with the academics while the case study was being conducted, including their results for "GIST." "GIST" only received a score of "2" (B1-A2-B3 in CAF) for its overall performance, with each attribute receiving a score of "1" (B1) for the infrastructure, "0" (A2) for the people, and "1" (B3) for the product. As we have already discussed, the best total score for online education should be "6" or as close to it as possible, with an example of appropriate scores being "4" (for example, C1-B2-B3) or "5" (for example, C1-C2-B3).

7. Lessons Learned

We were curious to see how the case study institution managed their online education practices with their professors and students since they only received a total score of "2" regarding the implementation of the framework. One of the professors who participated in this case study said that they were simply reactive and not proactive in anticipating the administrative or technological problems that the faculty and students would encounter, resulting in a mess that resulted in incomplete lectures, tardy faculty evaluations of assignments, lower student participation in discussion/clarification forums, and subpar preparation and delivery of digital content. In addition to poorly maintained IT assets and less user-friendly online learning tools, our case study institution even had trouble training its staff on how to utilize its newly launched online education management tool (OEMT). This shows how poorly educational institutions handle staff and student change management, which is crucial to the success of online learning.

The case study institution was ready to build up its IT resources, with examples of improvements including stronger internet connections and system upgrades or configurations. Since free products only offer a few functions, the case study institution was also interested in spending money to purchase a licensed version of their current online education software program. However, their biggest limitation was that, under their current approval and budget management methods, they would need additional time to make use of two features: the product and the IT resources. The case study participants acknowledged that implementing online education would be challenging and would not benefit faculty or students unless the institution's top management made a strategic action plan to prepare for it by allocating IT resources, assisting employees in adjusting to change, and recommending the use of an intuitive online platform.

8. Recommendations

Based on the application of our proposed Capability Assessment Framework (CAF) with the help of a case study guided by Yin [27] and by relying on the lessons learned from it, we now present our recommendations to institutions for a seamless transformation to online education.

Digital technology integration has great promise for creating opportunities for cognitively stimulating higher learning, not just in the face of present or upcoming crises (e.g., [29,30]). Because of the greater temporal and spatial/geographic flexibility, online learning systems also allow more varied students with various constraints (such as maternity, a distant place of residence, or part-time study) to benefit from a potentially excellent university education [31]. Without any face-to-face interaction, the digitization of education may not be as pervasive and all-encompassing as it was in traditional times, and change processes may be slower and less inevitable. In spite of these distinctions, there are many lessons to be learned by examining how teachers and students behave, interact, and think when faced with a challenging circumstance that pushes everyone outside of their comfort zones that necessitates a quick response. Based on the extensive and worldwide use of online teaching and learning in higher education, both the positive and negative characteristics are more obvious than ever before. Even though the factors we're discussing are the same whether we are in a crisis or not, quickly and rigorously implementing the derived measures is far more important in an emergency.

Here, we provide some suggestions to educational institutions to help them to smoothly move from in-person instruction to online instruction.

Choice of online product: It is not necessary to switch to new technology or new online platforms quickly without first thoroughly reviewing their features and other technical requirements for institutions that have already adapted to Google Classroom or Microsoft Systems, both of which are free for educational institutions. In reality, amid a crisis, such as the current one brought about by COVID-19, it is advisable to keep things simple and use the resources that an organization already has access to. Later on, organizations might investigate other online tools being offered.

Use the same online product: Whether it is a paid-for OEMT or a freeware OEMT, all faculty members are urged to use the same online software product. This will enable professors and learners to fully utilize the product's capabilities by immediately being able to share their own experiences with the product. Different software products used by different teachers will only make learning more difficult for students because each product will have a different user interface and operating system.

Leverage IT resources: Only when the institution is aware of the IT resources available to their professors and students can it advise them on the best methods to enhance it so that they can use online education services without any problems. Only then is uninterrupted teaching-learning via an online mode conceivable. For instance, internal computer maintenance cells may serve as their guide in defining the bare minimum hardware and software requirements that must be upheld for desktop or laptop computers at home.

Promote Blended Learning: During the interview, a few professors advised using a blended learning approach (also known as a "flipped class" model) [32] rather than an entirely online class-based course delivery. According to this concept, the faculty would share some or all of the audio/video lectures or online course materials with the students before engaging in any online interaction. Before online lectures, the students can download materials at their leisure and utilize them for fast reading/listening exercises. Depending on the institution's and the students' IT resources, the course faculty could decide whether to use this model or a full-fledged online platform for delivering courses.

Motivate and train people: Any business undergoing a digital transformation will only be successful if it invests in the staff members who will be responsible for putting the technology to use [32]. Regarding people (students/faculty), the most critical concerns for our case study institution were the lack of knowledge about online education on the part of some faculty and students, the lack of interest in such a mode of teaching on the

part of others, and the difficulty, despite best efforts, experienced by the remaining group in using it effectively due to a lack of training and insufficient IT resources. To break out of this impasse, a team composed of a cross-section of faculty members should initially be assembled to adopt online education. After that, this team might receive training from a different corporation or from subject-matter experts from other organizations. They might then gradually train the students as well as the other academic staff members at their institution. Furthermore, by having their internal training team use the product, the institution will be able to fix a few technical issues or features. To effectively provide online lectures and implement cutting-edge evaluations using online platforms, the training staff and selected faculty members who are well-liked by their students should be given rewards. The institution may think about awarding them with incentives such as reward points or appreciation certificates.

Do not shrink IT investments too much: The organization should be ready to spend a small amount on IT to use the capabilities of their present product, if one already exists, or to buy a new one. These types of investments are essential since some online learning resources are only accessible on Android, while others may cost a little more than normal but may be compatible with a variety of operating systems, including Linux, Microsoft, and Android. Both mobile apps and web-based versions of these tools should be accessible.

9. Conclusions

In studies concentrating on the attitudes, abilities, and knowledge of instructors in higher education institutions, it also became clear how crucial it is to have personal experience to comprehend the effects of emergency online learning and teaching. This focus on resources is consistent with the Expectancy Value Theory [33], which holds that a person's motivation to engage in an activity is influenced by both their subjective task value in a particular domain and their expectations for success (i.e., competence-related beliefs). In the case of emergency online education, it may be hypothesized that both external and internal resources, particularly attitudes linked to competence, affect expectations for success. However, positive attitudes toward technology seem to boost student abilities to handle emergency online learning without regard to emotional–motivational student profiles, which is consistent with other research on the significance of ICT competencies and attitudes towards online learning [23]. In other words, with more positive ICT attitudes, emergency online learning can be seen as less risky.

If institutions are unwilling to invest in human capital, the benefits of online education cannot be fully realized, and institutions will have trouble properly utilizing their IT infrastructure and online learning platforms. If they do not invest, institutions risk lowering the sophistication of the employed electronic materials, frustrating both users and instructors. As recommended for most organizational changes [34], a comprehensive strategic method to change management is required for the implementation of online education. The potential of online education to reach as many students as possible all over the world can, if carried out well, increase revenue for educational institutions in addition to providing accessibility from anywhere and flexibility in delivery. The experience of learners using online education needs to be better understood through future research.

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