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Designing of User-Centered Framework for eLearning Environment for Indian Students

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A B S T R A C T

This research studied the pandemic induced shift to online learning in the India, by online ethnographic studies focusing on various stakeholders and proposes a framework for eLearning environments in the Indian context. The research began with the literature review which reflected the lack of empirical studies done in the area and hence research questions were formulated accordingly. The study was conducted via interviews both teachers and students across the country, teaching and learning in different settings during the pandemic in 2020. The findings and insights were gathered to frame an eLearning environment model for the Indian context.

Keywords: eLearning, online learning tools, ethnographic research, pandemic, Covid 19

1. Introduction

As the world was hit by COVID-19, India witnessed one of the "greatest exodus since partition" (Ellis-Petersen and Chaurasia, 2020) displacing around 1.4 million migrant workers and others working in the unorganised sector as the country went into an unheralded lockdown to curb the spread of the virus. 90% of India's population engaged in disorganised work, had either moved back home along with their children or were unable to send remittances home throughout the period (Modi & Postaria,2020). In such a situation, the emphasis on technology-driven education has adversely affected a total of 320 million children, preventing many from continuing school education. The pandemic has exposed long-standing issues of inequality and a digital divide in India need to be addressed by future economic, education and digitalisation policies (Modi and Postaria, 2020). During November 2019, India's internet penetration stood at 40% of the population, (54% in urban and 32% in rural), leaving many students at disadvantage (Nielsen and IAMAI, 2019). While the government endorses India as the flag-bearer of the digital revolution and acknowledges that it is a diverse and multilingual country, e-learning platforms cannot replicate the various dialects, varied contexts and different lived experiences that are brought together by physical classrooms (KPMG, 2020).

In terms of knowledge transmission, technology has really advanced, however the method of deliverance still remains the same. There is a fundamental need for a shift from the traditional ways of teaching to reimagining the whole paradigm, which capitalises on the opportunities of technology. This research was aimed at answering the following questions:

1. How has the teaching practices changed since the shift to e-learning due to COVID-19?
2. What are the new classroom experiences enabled by technology in e-learning?

The objective is to construct a use-centered framework for eLearning through an empirical analysis of the COVID-19 induced online education scenario in India, so that it can be applicable to improve e-learning in India.

2. eLearning

eLearning or Online learning, a subset of distance learning is used to refer to web-based training, distributed learning, Internet-based learning, web-based instruction, cyber learning, virtual learning, or net-based learning (Urdan & Weggen, 2000). A more recent of eLearning would be blended learning whose definition have also been a topic of debate. Keengwe and Kidd (2010) describes blended learning as combination of face- to-face experiences with web-based learning experiences i.e., technology supplements traditional teaching. Mirriahi, et al.(2015) finally arrives at the definition as, "a process of integrating the most appropriate learning and teaching strategies, technology and/or media to provide meaningful, flexible learning experiences to achieve learning outcomes". Another consequent emerging concept is m-learning or mobile learning with the advancements in mobile technologies, where learners now have to skilfully navigate through the incredible, confusing and complex information that is now readily available (Brown,2005).

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3. Methodology

The change in the education scenario was studied through interviews, i.e., Unstructured interviews with three teachers and structured interviews with 12 students. The data collected were then analysed to construct a use-centered framework for eLearning in India. The details of the data collection is placed in the following paragraphs.

3.1 Domains of data collected through interviews

Three interviews were conducted with instructors, one teaching at a school for higher secondary classes, one teaching tuition classes as a supplementary course for higher secondary students, and the other an independent artist teaching his skills as a short course online. Other characteristics are listed out in the table 5. The interview investigated the creative classroom climate as described by Van der Wouw (2017). The climate is outlined using Ekvall's ten dimensions for a creative environment, which are: Challenge, Debate, Dynamism/liveliness, Freedom, Idea Support, Idea Time, Playfulness/Humour, Risk-Taking, Trust/Openness and Conflict. Students' involvement in areas like course design, setting the social norms as well as partnering with teachers were also looked into as suggested by Mccombs and Vakili (2005) in their learner centred framework. The four dimensions of instructor roles proposed by Liu et al (2019), I.e., Pedagogical roles, social roles, managerial Roles and technical roles were also utilised to inquire into the new instructor roles**.**

Table 1 Details of instructors interviewed during Covid 19

Deatils	**Participant 1**	**Participant 2**	**Participant 3**
Age (in years)	46	20	**24**
Subject	Social Science	Science	**Art (illustration)**
Type	Formal	Semi-Formal	**Informal**
Course Duration (in weeks)	36	36	**5-6**
Experience (in years)	**12**	**2**	**0.5**

3.2 Domains of data collected from students through interviews

Structured interviews with students were conducted with 12 students during March-April 2021. These students were of different education levels, ranging from class 9 to 12, undergraduates and post-graduates, and also students undergoing entrance preparations as well as students doing online courses from platforms like Coursera. Questions were structured to identify different learning strategies being used under four different learning contexts: 1) During live classes or lectures, 2) While completing assignments or homework 3) Preparing for exams and other tests and finally 4) when feeling low on motivation. Data was collected over telephonic interviews.

4. Research Findings

Through the interviews, the teachers gave insights into how they organised their classrooms and the challenges they faced, whereas the students gave insight into the different strategies they have adopted and how they differed from their normal ways of learning in an offline setting.

4.1 Insights from teacher on teaching practices to face challenges of online educations

The fundamental elements of the learning environments, illustrated in figure 1, as described by the participant teachers are the community of learners, the repository of all learning materials and the synchronous live lecture sessions. The active learning community is an integral part of the environment, where communications take place without the bounds of time or location. These small sized learning communities run by the instructors themselves, gives them much more flexibility to innovate and tailor own courses based on the community's needs and wants. The communications here include both asynchronous interactions such as the Instructions given or the homework materials and practice sheets; and synchronous ones like debates, or supporting documents for the live classes. The communication can be individual private conversation between the members as well as one to different groups. The medium of communication aren't necessarily text based, but could be voice notes and short video clips as well. The topic of discussions are not always related to the subject, e.g.: movies, current affairs, storytelling etc., and such conversations are primarily initiated by the instructor as a cue for interaction.

Then a repository of resources, hosted by common cloud storage technologies of platforms like Google Classroom, Telegram etc. are available in eLearning. All the content created by the learners during different learning activities, as well as supporting materials and lecture recordings by the instructor are stored electronically and accessible to all. Electronic storage also has the added advantage of safety and security, unlike the physical records, which are often lost or damaged. Such a storage builds up a portfolio of the student developed over the years. Finally, the live conference sessions enables the purely synchronous channel of interaction. Incentives are also given ("surprise gifts") for those who are active in giving feedbacks and responses. The

instructor also makes use of the internet culture like memes for conveying messages and hence, brings in an element of humour and playfulness. Instructors also reported the use of social cues and dialogues to keep the sessions engaging. Once such instance was retold by the participant instructor as:

'Suppose we draw a flower, I say to them, "If you enjoyed drawing this, comment in 'ILI' for I LOVE IT", and then chat-box gets filled with these comments, some students even unmute and say they love it". "Comment in an X if you're excited", and then you can see it coming xxxxxxxx. If the participation is low, I'll see only one or two x. Then I'll say, 'Oh, only Deepali is excited, how about the others. Ok, I might as well just close and go'. I just say it as a joke but then everybody responds right away.;

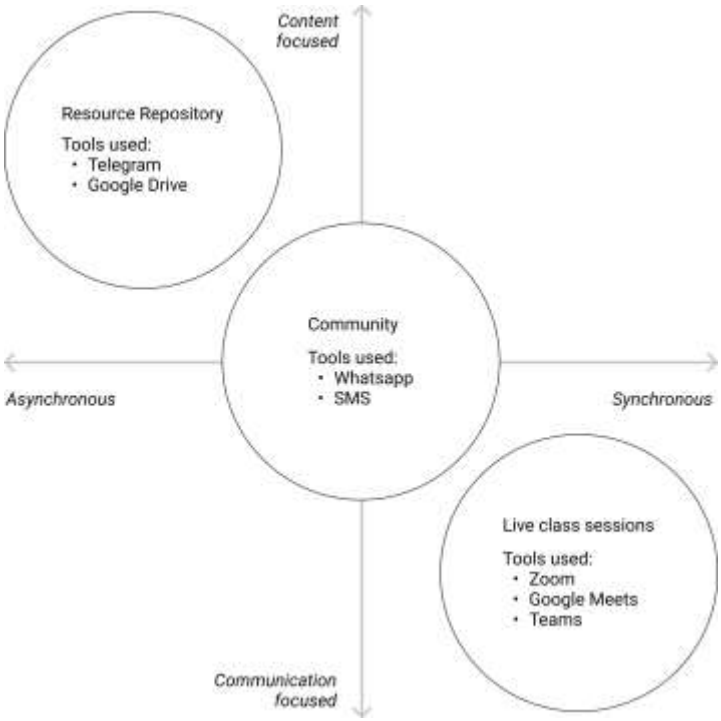

Figure 1. Teaching environment

The teaching processes were further supported by different tools as listed in Table 2. These include presentation tools such as NearPod, Prezi, Popplet etc., assessment tools such as Whiteboard.fi, Mentimeter etc., content curations tools such as Wakelet, YouTube etc., and other collaborative tools such as Linoit, Padlet etc.

Table 2 Applications being used to support teaching online

Application	**Use**
Book Creator	Make Digital Books
Edpuzzle	Formative Assessment
Kahoot	Multiple choice quiz games
Linoit	Sharing & collaborating with sticky notes
Mentimeter	Live polls, quizzes, wordclouds, Q&A
Nearpod	Create and deliver interactive lessons with formative assessments
Padlet	Brainstorming on topics and mind mapping; graphic organiser
Prezi	Presentation with over the video graphics
Wakelet	Digital content curation

4.2 Insights from student on eLearning strategies

Structured interviews revealed many strategies or 'workarounds' learners have developed over time to navigate themselves with their learning process, through the vast array of services and resources, scattered over the world wide web as presented in Table 3. It also provided an insight into why students behaved the way the teachers described, as it exposed more about the learners' different contexts. With the absence of any geographical or temporal

bounds, learners get the chance to have a truly personalised learning experience, which is to be further refined through effective pedagogies designed based on principles such as the transactional distance theory (Park, 2011).

Table 3 Some of the learning strategies adopted by students under different contexts

Context	Strategy
Live classes / Lectures	"I jot down some points quickly during the class. And then later, I make detailed notes starting with the base concepts. The video recordings are helpful as I can pause and play it"
	"I don't attend the subjects that I'm not really interested, like physics. I later study them by myself by going through the recording"
	"I use the chat to post any doubts. I prefer the text-chat to voice because I'm a bit insecure about speaking with about 80 students listening"
	"I have Google open in a new tab, ready to search new terms or things that I didn't understand"
Assignment completion	"When we get an assignment brief, I try to break down them into little steps, to sort of have a to-do list of things, where I cross of things as I move forward"
	"I try to consult my parents after I work on something. To get their perspectives. Also, some of my friends who are not in my class. That way my project would be different from the rest of the class"
	"I use brainly.com to find answers because it's all Q&A there. When I type in google, it gives out endless results after results. This way it's easier"
Exam/Test preparations	"After self-studying, I get on a conference call with two of my friends and discuss topics we found difficult. If the doubt still remains, I ask the teacher"
	"2 weeks prior to the tests, I start by prepare a Timetable. Time given for different topics depend on difficulty, interest, emphasis by instructor etc. The more theoretical topics need more time too, they are forgotten easily"
	"We have a WhatsApp group, 'panditharsʼ. All the students post their doubts there while preparing them and someone, usually the most active kids, answers them"
Motivation	"Sometimes I listen to videos of management talks or conspiracy theories. I find them interesting"
	"I try to engage in some physical activities like cycling, walking etc. I believe a healthy body keeps a healthy mind"
	"I play Fortnite with my friends. It's a great way of catching upon with them too. But the coins are too expensive to buy"

5. Analysis & Synthesis of eLearning environment model

Summarising the findings provided an overview of the insights acquired throughout the studies, and also possible design principles or concepts that addressed them, either attempting to solve an issue or by trying to implement certain insights. These principles, opportunities and concepts were then categorised into certain groups, i.e., people, processes, product and tools, based on the pattern seen while generating concepts. By the process of morphological synthesis presented in Figure 2, complementing concepts were linked together by colour coding and bundled into separate solutions. Three set of solutions were generated, learner centred, content centred and community centred, and certain concepts that were applicable throughout the concepts were considered as core ideas.

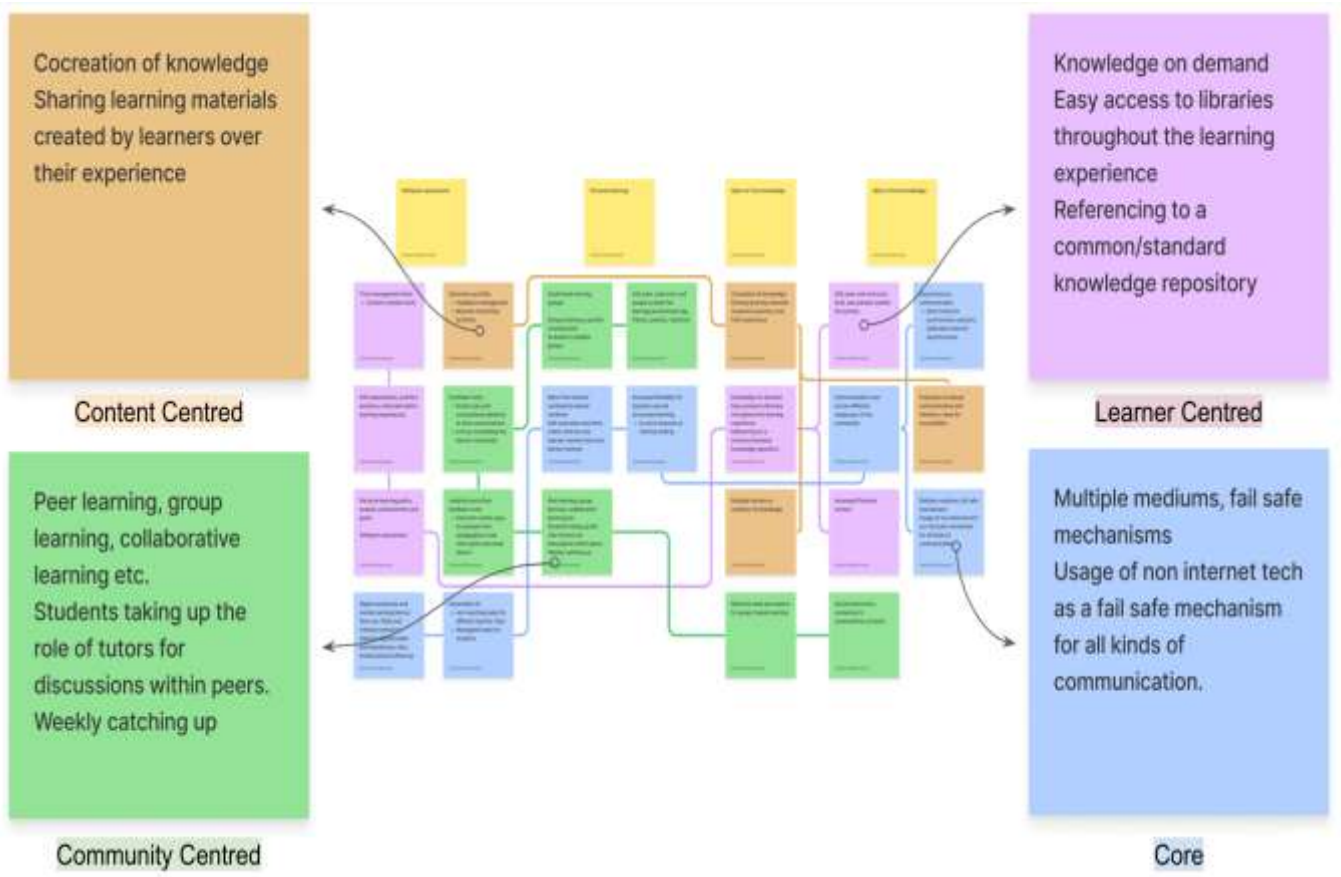

Figure 2. Morphological synthesis

The entire constellation of offerings can be realised via a platform strategy based on the model thus developed as presented in Figure 3. It allows its users and participants, or in this case learners as all teachers, students, facilitators are considered as learners under the asper the learner centred framework, to gain value through different means. The core value unit of the platform is the knowledge created throughout the learning experience, and the core interactions on the platform are essentially the communication between the learners and the individual interactions that contributes to the shared knowledge. These interactions are majorly of two types:

1. Individual learning: Asynchronous interactions that are mostly content-intensive and related to individual work.
2. Collaborative learning: Synchronous interactions that are communication intensive and related to group work.

Communication being one of the greatest strengths of mobile learning, one of the overarching design patterns seen throughout the platform is the usage of multiple mediums of communication as alternates for the user, including non-internet and print based mediums as a fail-safe mechanism. This includes a wide range of services from voice calls, postal mails to more elaborate concepts like mobile smart libraries, automated learner support systems, localised education centres etc.

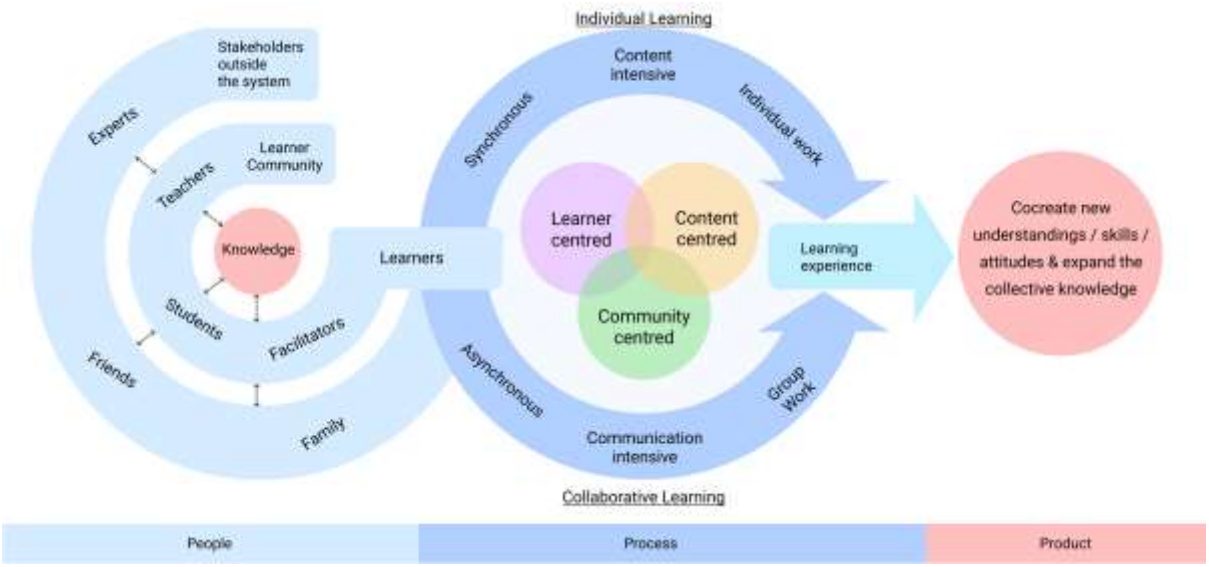

Figure 3. eLearning environment model developed

6. Summary and Conclusions

The platform model provides a framework for a community of learners to interact with each other and engage in different activities that co-create knowledge, which the subsequent learners can use to learn for themselves, and at the same time improve further with their contributions. This allows many types of instructors, ranging from short informal courses by individuals, to long term courses by universities, to reach out and engage with a large number of audience and grow their own community or 'learning communes'. With different kinds of stakeholders imparting knowledge and moderating debates, these communities become a huge repository for different learners to explore and engage in both academic and non-academic interactions that enable learning; supported by technology to facilitate these interactions. Such communities would also be favourable to people from areas where accessibility to education is limited due to the lack of infrastructure or resources. Devices such as mobile phones allow for synchronous audio communication with much greater ease and at relative lower cost than online technologies, especially in areas where bandwidth is still a limitation. Being a cheaper option, it also invites people who couldn't afford formal education in the traditional setting. It also opens up an opportunity for educators who are entrepreneurial, or anyone who possess some knowledge to transmit, to set up their own classrooms and courses to attract students without any geographical or temporal limitations. This opens up a massive global audience looking for low-cost education, especially from developing countries. The large difference in opportunities in education between countries is one of the basic causes of global inequality.

Technology has now provided the opportunity to truly democratize learning, with the idea of learners building their own environments and resources for themselves; an open-source repository for their successive learners to learn from and build upon. The learner centred approach considers all of the students, teachers, and other stakeholders involved as equal learners, together making up a society striving towards the common goal of expanding the collective knowledge that is socially useful. With equitable access to information under such an egalitarian system, each learner is free to explore and learn any areas of study according to their own needs, and also contribute to the same according to their abilities. Schools and other institutions need not be mere factories churning out a minority of graduates every year but can be the leaders supporting its fellow learners in their own continues journeys of learning to navigate through in this growing body of information. An autonomy of such a degree would allow learners to pursue their own unique paths to be individuals with a diverse set of multidisciplinary skills, rather than being restricted to a certain specialisation with a risk go being irrelevant amidst the ever-changing nature of the industry demands.

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