

The Promise of Technology-Enabled Learning: A Reality Check

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ABSTRACT

College education and learning until recently was largely classroom based. The use of new-age technologies in education was limited. However the Covid-19 pandemic changed the world and with it, the way education is delivered. Technology-led education took center stage and all stakeholders were suddenly forced onto the technology-enabled learning bandwagon. Technology-enabled education offers a lot of promise and provides solutions to some of the issues existing in the traditional model. It also throws up interesting possibilities but has its own share of foreseeable as well as hidden challenges. This paper focuses on the use of technology especially in higher education. It examines the constraints and challenges that could inhibit the learning process resulting in sub-optimal learning outcomes. It proposes a framework based approach using Technology, Stakeholders & Policy (the TSP framework for technology-based learning). This framework advocates a calibrated inclusion of elements like technology, policy, user interface and fall back mechanisms within the socio-economic context of the community/region where it is applied.

Keywords: education, technology, framework, promises, challenges, stakeholders, socio-economic

1. INTRODUCTION

College education and learning until recently was largely classroom based. The use of new-age technologies was limited and was at best restricted to the use of PowerPoint presentations and pre-recorded video lessons. There was a school of thought that advocated greater usage of technology as a supplement to the existing classroom based educational pedagogy. This was based on the successful experience of online classrooms being run by some of the Edutech start-ups. The cynics scoffed at the idea and, learning continued to follow traditional lines of a physical classroom, boards/smart boards, PowerPoint presentations, fixed classroom sessions and paper and pen assessments.

Fast forward to early 2020, the pandemic changed the world and with it, the way education is delivered. Proving the cynics wrong, technology-led education took center stage. It was an idea whose time had come, not in a calibrated evolutionary way but with a suddenness that forced the education community to review the existing processes and transform itself. The rules of learning are being re-written, in a very profound and a far-reaching way. Technology-enabled learning is now the talk in the media and all stakeholders – students, teachers, parents, education administrators are exploring technology-enabled learning solutions. The debate on technology in education has moved from an ‘if to a how’.

2. TECHNOLOGY-ENABLED EDUCATION

As we take stock of what technology-enabled learning means, it is perhaps an inarguable fact that we are at an inflexion point. Technology enablement offers solutions to some of the issues with the earlier traditional model, throws up interesting possibilities while also having its share of foreseeable and hidden challenges [1]. Let us at this stage peel away the hype and clinically examine what technology-enabled learning means. The facets to ponder on are - the delivery mechanisms, its impact on affected stakeholders, the benefits in this transition and importantly the pitfalls & challenges along the way.

A. The Guiding Principles

It is important that as we move ahead; we recognize that next-generation learning should not get clouded by technology per se; but it should be centered on learning outcomes. For this it is important to have a planned calibrated approach,

imbibing the best that technology can offer while also keeping in view the socio-economic and cultural context of the learner. It is important to avoid designing the learning process where the experience and outcomes are superseded by technological considerations. Instead the thinking should be that of utilizing, combining and extending technological solutions to further the aims of learning [2].

B. Current and Future Scenarios

Technology-enabled learning today conjures up images of pre-recorded video lessons, online classes using platforms like Zoom, Google Meet and others. Online learning has indeed been a game changer in knowledge dissemination across geographical and institutional boundaries. Researchers and students of higher education have greatly benefitted by access to subject matter experts and professors in international universities, which otherwise would not have been possible. Technology-enabled collaboration tools, internet-based knowledge sharing sessions and ease of information access using search engines have greatly benefitted many. All of these and more should be leveraged in a pragmatic and innovative manner. Beyond the current practices and obvious ways of using technology, there is also a need for a careful thought on leveraging futuristic technology solutions keeping in view further enhancement of learning outcomes. Technology enablement should be considered at various stages of the educational process from the basic to the advanced. Automating and streamlining basic college administration through workflow based software, removing the drudgery of collating marks and publishing results using robotic process automation, overcoming logistical constraints of conducting assessments are examples of some of the basic processes which would benefit from the use of technology.

An interesting online learning case is science lab work which is typically difficult to visualize as being online today. However there are software tools which simulate a lab-like experience online for the learner [3]. There are also other advanced uses of technology in learning that can be thought of. One such example is the gamification of learning [4]; this is not something new, but with technology the possibilities are many more. This technique can be applied for subjects where outcomes are probabilistic and with inter-dependent variables. Another example is using virtual reality and augmented reality in learning. These technologies can be used to overcome the constraints that require one to be physically present in a location so as to experience learning. For instance, a student learning a foreign language can be “transported” virtually to the locale where the language is spoken so as to benefit from an actual “look and touch” experience. The retail industry has been using virtual and augmented reality technologies for a while now; the learning industry can borrow such idea, contextualize it and implement at scale.

The promises of technology-enabled learning are many. Learning is made possible irrespective of the constraints of time and place. Access to learning resources results in democratization of education and equalization of opportunities. Going further, analytics can be used to discern patterns in a learner’s journey, helping to overcome the drawbacks of the current exam-based assessment criteria with its emphasis on student marks. The marks based criteria as pointed out in educational research literature is limited in its ability to come up with a real and meaningful insight into an individual’s true abilities [5].

To repeat, the possibilities are endless. But herein lurks a “hidden” problem. Learning outcomes at the end of the day are a personalized experience and depend on multiple factors which are discussed in section 3. In the enthusiasm to embrace the new, it would be short-sighted to ignore the ground level realities when designing learning solutions. Technology-enabled learning cannot and should never be imagined as a one size fits all type of solution. There is a need for a debate involving academia, industry, learners and knowledge providers so that possibilities can be imagined, examined and whetted with the touchstone of reality and pragmatism.

3. DESIGNING FOR THE NEW NORMAL

Constructing a framework for technology-enabled education, involves a careful examination of a number of interrelated factors. These factors can be grouped under the three broad dimensions viz. a) Technology (T) b) Stakeholders (S) and c) Policy (P). Each of these dimensions in the TSP framework has its own attributes. This framework is based on the interplay of the above dimensions for building a robust and scalable education system (figure 1).

A Features of the TSP Framework

a) The Technology Dimension:

The technology dimension considers the attributes like tools & platforms, channels of delivery and the use of analytics and insights for effective learning outcomes. The design principles are as follows:

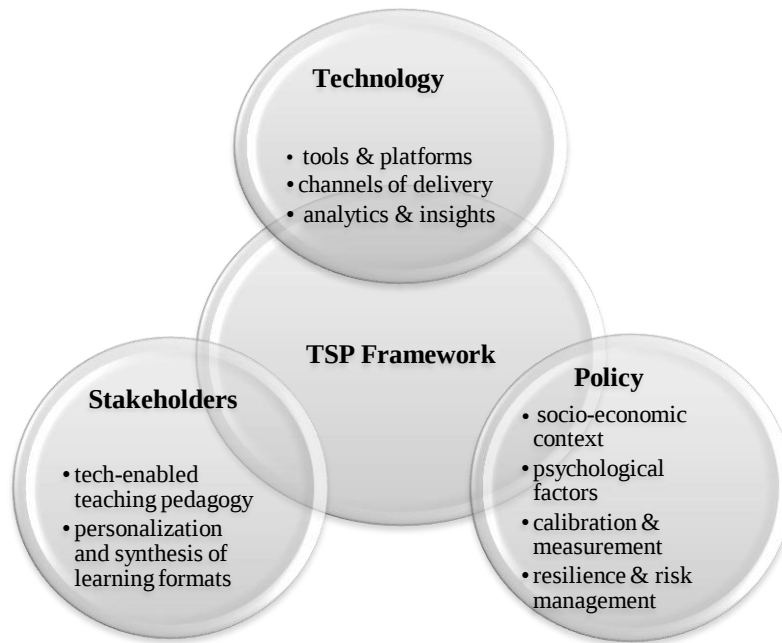


Fig. 1: The TSP Framework

- i. Use design thinking principles to contextualize technology initiatives under consideration. This means - keep the learner at the center of all technology initiatives being contemplated. Align the initiative to the domain, a one size fits all approach is a recipe for failure. Let us exemplify this with a simple case – the level of technology usage and its implementation should be very different when teaching a subject which requires just classroom type lectures versus one that requires lectures, a writing board and labs (like a physics or chemistry lab).
- ii. Since technology-enabled learning is at an inflexion point, it would be myopic to consider only the technologies and solutions that are currently available. The possibilities that tech-enabled learning brings, should be explored to its limits and creative solutions going beyond the obvious should guide the thinking of those working on education policy making and learning outcomes.
- iii. In charting the course for the future of technology-based learning solutions, the negative consequences should not be overlooked. It is easy to lose sight of this in the hype that surrounds tech-led learning. One of the unintended negative consequences is the “lazy thinker” syndrome. Since information is available at the click of a mouse button, spell & grammar checkers do the work of correcting spelling and grammatical errors and solutions to classroom questions are easy to find on the internet, there develops a tendency to delegate the learning process to technology. Technology should be aiding the learning process and not taking it over.
- iv. Technology-enabled learning also spells hope for the physically disadvantaged, especially the visually challenged. A greater usage of assistive technologies for visually handicapped students should not merely be considered as desirable but should be made an integral part of inclusive educational policy. There are technologies like screen readers which if actively supported and propagated would enable learning for visually challenged students.

b) The Stakeholder Dimension:

- i. The stakeholder dimension considers the attributes like aligning both teachers and students for new tech-enabled teaching pedagogy, personalization and synthesis of learning formats. The design principles are as follows:
- ii. The learning curve for getting familiar with new teaching pedagogies and technical solutions is a very critical part of the success equation. Since the majority of educators have spent years using a particular process of teaching, the leap from the traditional ways of teaching cannot happen without a concerted effort to make it happen. This requires a carefully crafted change management strategy to align educators to the new normal and handhold them in the journey. Getting accustomed to the new ways of teaching with technology at its core requires effort and support. If this is not done with the attention it deserves, the goal of better outcomes using technology will remain an unfulfilled one.
- iii. Students must also be attuned to this new method of learning. There are many reports of student dissatisfaction with online teaching and the replacement of traditional ways of learning. While it is argued that young learners are

digital natives and will take to technology driven learning easily, this hope can be misplaced. Passive content absorption that social media typically produces in young minds is different from an active fully engaged participation that a technology platform mandates for effective learning.

- iv. Technology-enabled learning should not preclude classroom learning, instead a harmonious blend of traditional ways with the technological options should be considered. This synthesis must be periodically revisited and recalibrated to keep it contextual and contemporary. We need to imagine a learning environment both in the classroom and online, a learning that does not end with a classroom session or because of a teacher's non-availability.

c) The Policy Dimension:

- i. The policy dimension considers the attributes like socio-economic context, psychological factors, calibration & measurement, resilience and risk management. The design principles are as follows:
- ii. It is important to keep in mind the targeted audience, not just in terms of learning outcomes but also socio-economic factors. Device availability and connectivity is a pre-requisite and the economic cost involved needs to be factored. It is important that while working on technology solutions for improvement in learning, their availability, accessibility and cost are not ignored. The digital divide is a reality and ignoring it would end up exacerbating it. We need to keep in mind that education at its core is a social initiative also. Recent cases of student suicides due to lack of access to devices to attend online classes point to this underlying problem. Affordability & reliability of technology solutions must be borne in mind when designing for next generation tech-enabled learning.
- iii. An often-neglected aspect of technology enablement is the more subtle but equally important psychological impact of this shift from "offline" to "online". The lack of physical presence of a teacher, the missing physical infrastructure of classrooms and college corridors, the absence of diversionary cultural and sports activities and many more such things should not be ignored when working out the new normal of technology-led next generation learning. A survey done recently in the United States tells us that young college students miss the ambience of the brick and mortar educational system and would like to go back to it.
- iv. Besides the psychological aspects, the shift to technology-based online learning leads to situations of too much screen time, something that educationalists had previously warned about. The distractions and harmful effects on vision are a concern that should not be taken lightly.
- v. Technology can also be used to build resilience into the educational ecosystem. Principles of risk identification and mitigation used in other domains should also be applied in the educational and learning space. This aspect was recently spoken about by Mr Nandan Nilekani in his address to the students of Ashoka University, Haryana, (India). The new normal is visualized as one where we need to be better prepared for periods of disruptions; hence adequate thought and planning needs to go into this. The tenets of active risk management and mitigation which is so common in the corporate world should also find its place in the academic world. Learning should be viewed as an essential service and should be adequately risk-protected.
- vi. Multi-channel delivery of education is an effective way to cater to a highly segmented student demographics population. (which is a reality in a diverse country like India) An added advantage is that it provides active risk management. This may lead to a certain degree of overlap of delivery modes; but this overlap is desirable since it would help to build resilience and a fall-back mechanism.

CONCLUSION - THE WAY FORWARD

Technology-enabled learning is as we can see a complex phenomenon which has many facets to it. The equation has many variables and there needs to be careful thought given so that we can realize its benefits. It requires a framework based approach combining elements of, technology, policy, user interface and fall back mechanisms, all of this within the socio-economic context of the society where it is applied. Each of the point mentioned under the subsection "Designing for the New Normal" requires to be critically examined by experts in the respective areas so that a broad consensus on the way forward is achieved and a detailed roadmap is formulated.

ACKNOWLEDGMENT

The authors gratefully acknowledge the contributions of Information Technology consultant, Mr. JavedKutty, for his inputs for the original version of this document.

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