Teacher Education in the Age of Technology

Veena Kapur
University of Delhi
Delhi, India

Abstract

Technology in education is not a novel concept. Since there have been teachers and pupils there have been instructional tools to enhance the learning process. Technology is a powerful enabling tool which caters to educational change and, if used discerningly, it enhances the quality of education while making teaching and learning an interactive and interesting process. Yet technology is nothing without a teacher who has planned her lesson, where care is taken to intricately and seamlessly weave in technological interventions. In this age of globalisation it is a logical step that education uses advanced information and communication technologies. India too is a part of this new approach to transaction of education. Technology has seeped into the lives of the common man in India in a myriad of ways. From mobile technology to learning software, we can see its evidence in educational institutions. Yet India is still grappling with problems, like poor school enrolment, wastage and stagnation, shortage of teachers and poor infrastructure. These are the problem of an ancient nation with a population of millions, who are in need of quality education.

The challenge that faces Indian society is that despite being a cash-strapped nation, India has to transform schools into hubs of opportunity. This will foster ability in students to construct knowledge and develop creativity. Teacher education needs to be reviewed in the context of India's problems and the interface with a technologically advanced world. Translation of this tenet in practice means that teachers need to become key agents who can bring a continuously evolving society into being. This mandate will affect their role in a dramatic manner and therefore teacher education needs to be geared towards it. Teachers need to be imbued with a professionalism that keeps them abreast of new technologies and strategies, while committing them to continuous professional learning. The revolution in technology will continue and so will the revolution in educational practices and the way we perceive an emerging economy. This paper aims to analyse the problems India faces in coming to terms with the demands of a technologically advanced society and the role teacher education plays in that context.

Keywords: Digital natives, catalysts, collaboration, professionalism

Introduction

Schools today stand at the cusp of change. Globalization and its deep connection with technology has brought a palpable transformation in society and the way we perceive knowledge and its transaction. Schools have to prepare learners for rapid change and themselves transform into hubs of opportunities, so that they are able to foster abilities to construct knowledge creatively. Translation of this concept means that teachers need to become catalysts, key agents that can bring a new continuously evolving society into being (Hargreaves, 2003). How would this mandate affect their role while keeping them abreast of new strategies and technologies to be studied? To align themselves to the needs of society today, teachers need to be encouraged to teach in order to foster high order thinking skills, metacognition, constructivist approaches to learning and understanding, cooperative learning strategies, while employing a wide range of assessment techniques and the use of computer based and other information technology that enables students to gain access to information independently. The learners should also be able to create knowledge, apply it to unfamiliar problems and communicate effectively to others (Hargreaves, 2003; Novak and Gowin, 1984). Essentially, learning to teach or teaching to learn, in the present times, is technically more complex and wide ranging, since it draws on a base of research and experience about effective teaching that is always changing and expanding (Hargreaves, 2003).

Todays' teachers need to be continually engaged in pursuing, upgrading and self-monitoring their teaching and reviewing their professional learning, consulting and critically applying educational research, so that their practice is always informed by it. They can no longer be complacent that once they are qualified to teach they are qualified to teach forever (Hargreaves, 2003; Koehler and Mishra, 2007). It's not something you work upon, finding the appropriate strategies through trial and error. In todays' society it is vital that teachers engage in action, inquiry and problem solving together in professional learning communities, which can be in the real or virtual world. Teachers' must be helped to develop capacities for dealing with change and undertaking inquiries when new demands and problems repeatedly confront them. They have to make their schools into learning organizations where capacities to learn and structures that support learning are widespread among the teachers as well as the learners. It is an atmosphere that is stimulating for learning. In this way the school becomes an effective learning organization for teachers, administrators and learners (Hargreaves, 2003; Koehler and Mishra, 2007).

Is the present system of teacher education developing teachers with the skills and orientation needed to enable their learners to be successful in the 21st century Todays' learners are already active participants of online communities with a wealth of resources that extend beyond the bounds of their schools and well beyond a single teacher's knowledge and skills. These learners will pursue careers in a knowledge economy that rewards teamwork, continuous learning and innovation. Yet teacher interns continue to be immersed in antiquated programs that equip them to deliver primarily traditional, stand-alone, text-based instruction in self-contained classrooms. Moreover, the reports calling for reforms in teacher education only set higher and higher benchmarks for traditional teaching (Hargreaves, 2003). The reforms fall short of the needs of digital learners as they are preparing teachers for obsolete jobs. We cannot focus only on teacher preparation for schools should also change. Schools need to evolve from teaching organizations into new kinds of learning spaces. Teachers need to be trained so that they are ready to work in the schools of the future. It is time to reinvent teacher education for todays' learners, who need teachers who have the knowledge and skill to facilitate participation in a collaborative, Web-based learning culture (Novak and Gowin, 1984; Hargreaves, 2003) . These teachers would be able to:

- Facilitate and inspire student learning and creativity so that all students achieve in the global society;

- Enable students to maximize the potential of their formal and informal learning experiences;
- Facilitate learning in multiple modalities;
- Work as effective members of learning teams;
- Use the full range of digital learning tools to improve student engagement and achievement;
- Work with their students to co-create new learning opportunities;
- Be life - long learners, and
- Be global educators.

In order to prepare teachers with the above characteristics it is essential to transform teacher education programs into 21st century learning organizations staffed by teacher-educators who themselves are imbued with the characteristics listed above. Psychology and neuroscience have compiled a sound body of knowledge about how people learn (Novak and Gowin, 1984). Teacher educators need to integrate these and model research based-pedagogical practices through- out the pre-service teachers' academic instruction and field experiences. Moreover, collaborative, inter- disciplinary and inquiry based learning projects will provide teacher educators the opportunity to foster in their interns the ability to use appropriate pedagogical strategies coupled with effective technological tools (Koehler and Mishra, 2007). In the digital world of today it is important that teachers should be comfortable and competent using analytical tools in contemporary data systems to better understand the needs and progress of their students and to determine the most appropriate instructional responses. Preparation programs need to provide extensive learning space for practice in the use of contemporary data system. It is imperative to expose teacher interns to cutting edge technologies, individualized pedagogical strategies, and advanced data systems. The new educational practices will enable the teacher interns to work effectively in a rapidly evolving world (Hargreaves, 2003). The teacher education programs need to be keenly responsive to accelerating changes in global society and ready to quickly shed outdated policies and strategies to embrace new and more effective approaches that address the needs of 21st century learners (Koehler and Mishra, 2005).

Literature Review

Hargreaves (2003) proposes that we should reshape the future of schooling as we now live in a knowledge society. To teach now means to prepare learners for a world of creativity and flexibility provides examples of schools which operate as creative and caring learning communities and shows how years of "soulless standardization" (page 45- 66) have seriously undermined similar attempts made by many non-affluent schools. Hargreaves takes the critical reader beyond standardization to a future where teaching is concentrated on high skill, creative, life-shaping goals, as that is the focus of a knowledge society. The book is a critical analysis of the role of teachers in society and the impact of bureaucratization on teachers and learners alike and how can it be reversed.

What makes teachers use technology in classrooms is an important area that needs to be carefully addressed. Baek, Jung and Kim (2006) look at technology in classrooms in Korea. They emphasize that technology enhances classroom teaching, but that there are many obstacles that get in the way of teachers' use of technology in the classroom. The researchers undertook an experiment to find out why teachers use technology. They found that teachers use technology not because it makes children learn effectively, but because they are compelled to do so. The authorities insist on the incorporation of technology. Smith and Greene (2013) investigated the implementation of e-learning as a method of instruction to help pre- service teachers evaluate and improve upon the implementation of their lesson plans

in their real- world practicum experiences. The results showed that participants reported improved lesson planning, improved lesson implementation, and visual interpretations of best practices.

Other studies have found that even with inclusion of new technologies in the classroom, actual instructional strategies remain largely unchanged. Hofer and Swan (2006) found that teachers are hesitant to adopt a transformative view of technology where laptops are more than notebooks, PowerPoint means more than handwritten overheads. O' Mara and Laidlaw (2011) noted that the problem for teachers was not technologies but the methods used to implement them. Instead of using technologies to change curriculum, teachers continued the regular drill and practice. Teachers continued to drill skills even with iPad, iPod, Smart Boards, apps, and laptops to supplement material (Kirk, 2011; Little, 2011; Steffenhagen, 2011).

Change is sometimes slow and, oftentimes, change is slower in education. Integration of technology in teaching only happens when the teacher is comfortable and competent in doing so, provided the technology resources are available to the teacher. They will become competent when technology instruction is both provided and modeled for them in their education and when they are expected to use them in their teacher education courses. If pre-service teachers graduate with full competence in the use of technology and familiarity in how to integrate it into education, the use of technology in classrooms will increase. Universities should not rely on "chalk and talk;" only then will school educational experience change.

The Problem

The problem of teacher education in India is: Teacher Education programs in India are not preparing teachers who are aligned to the needs and trend of the technological age. Ironically these teachers are prepared in antiquated programs that equip them to teach text based stand- alone classrooms.

Objective

To study the status of Technology in Teacher Education programs in India, in the four courses, B.Ed., DIET, B El. El. Ed. and M.Sc. Mathematics Education.

The Design of the Study

The sample size was of 50 pre-service teachers from B.Ed. B.El.Ed, DIET and M.Sc Mathematics Education. The sample was delimited to the capital of India, Delhi, since it is representative of the diverse Indian population. The tool used was that of the structured questionnaire with ten questions.
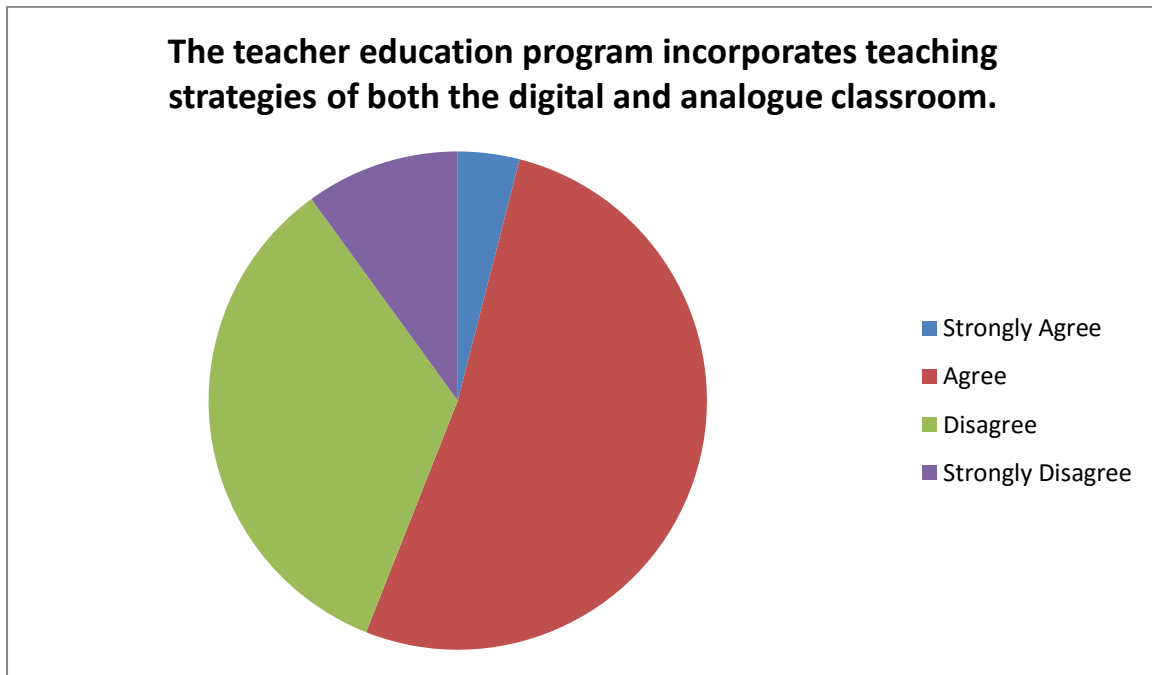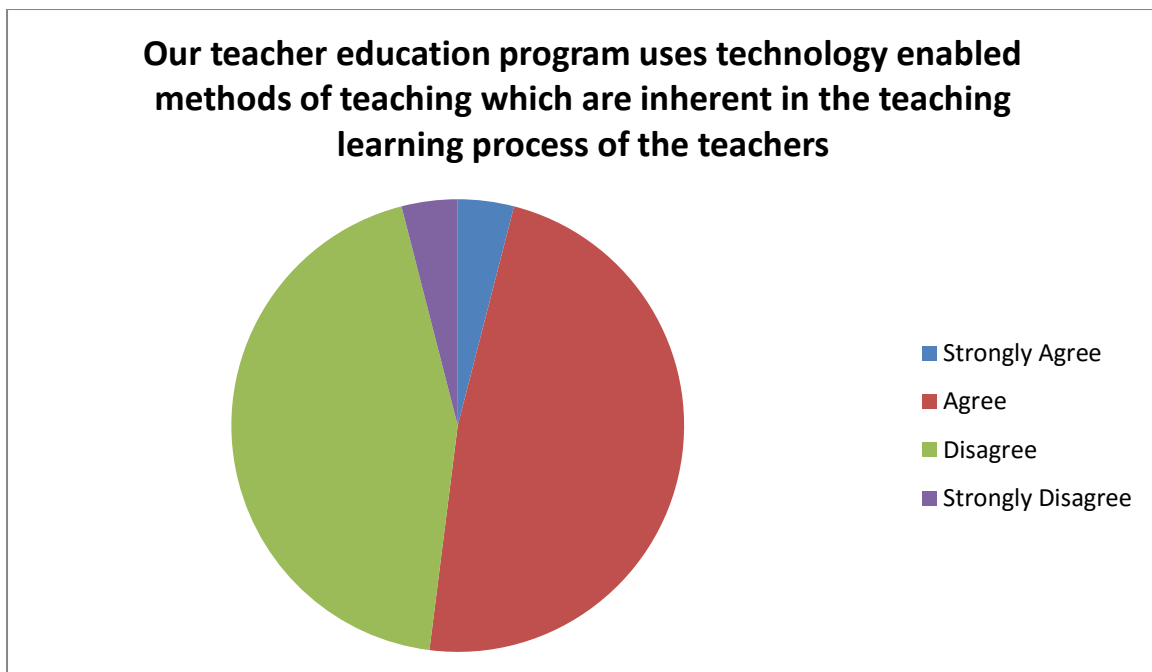
Analysis and Discussion

Figure 1

Figure 2

Figure 1 and 2 clearly show a pattern indicating that Teacher Education programs incorporate technology enabled methods while educating their interns. It is important to understand that the question asked in the questionnaire is regarding incorporation of technology and not the nature of the incorporation.
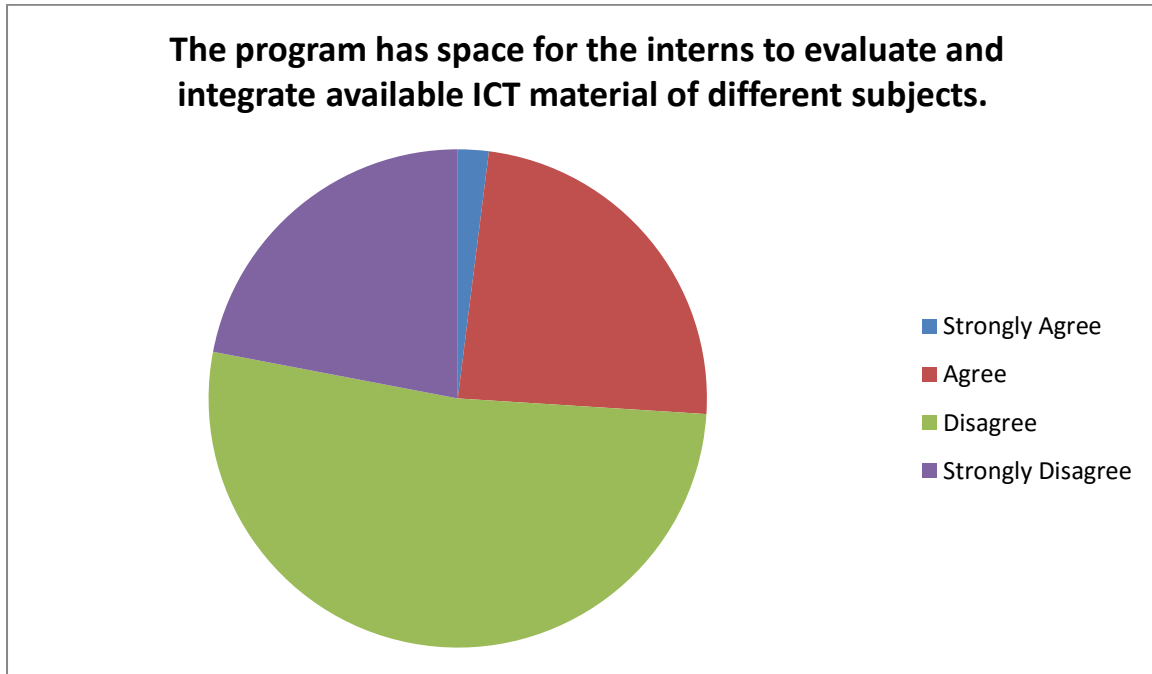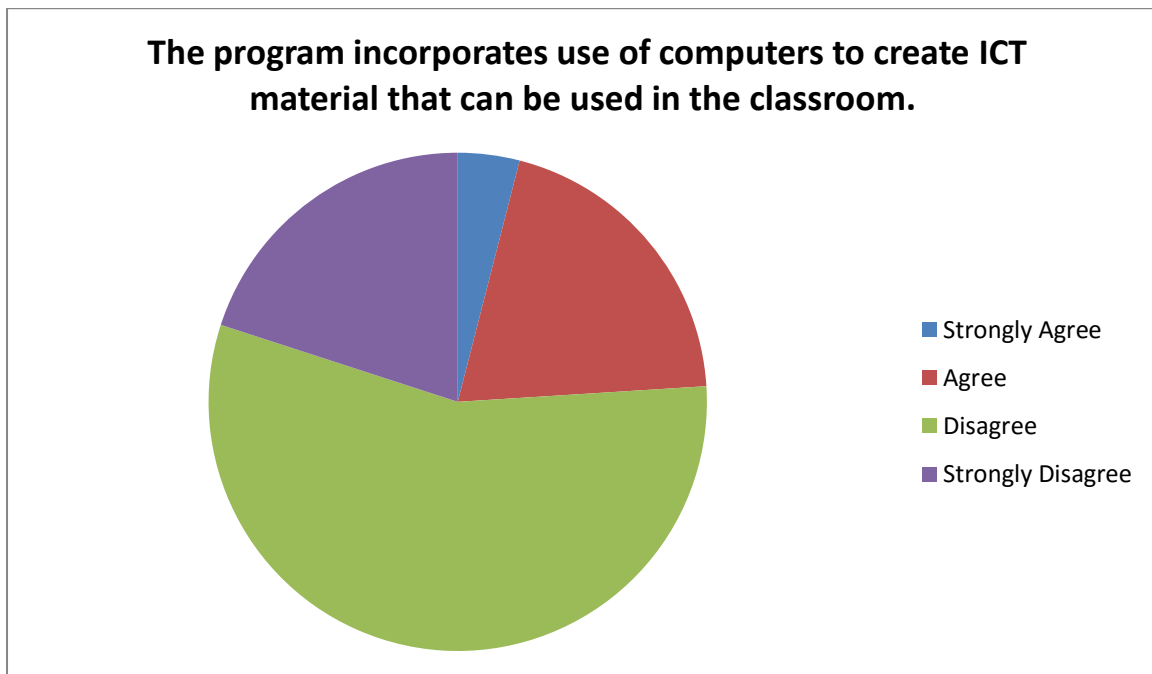
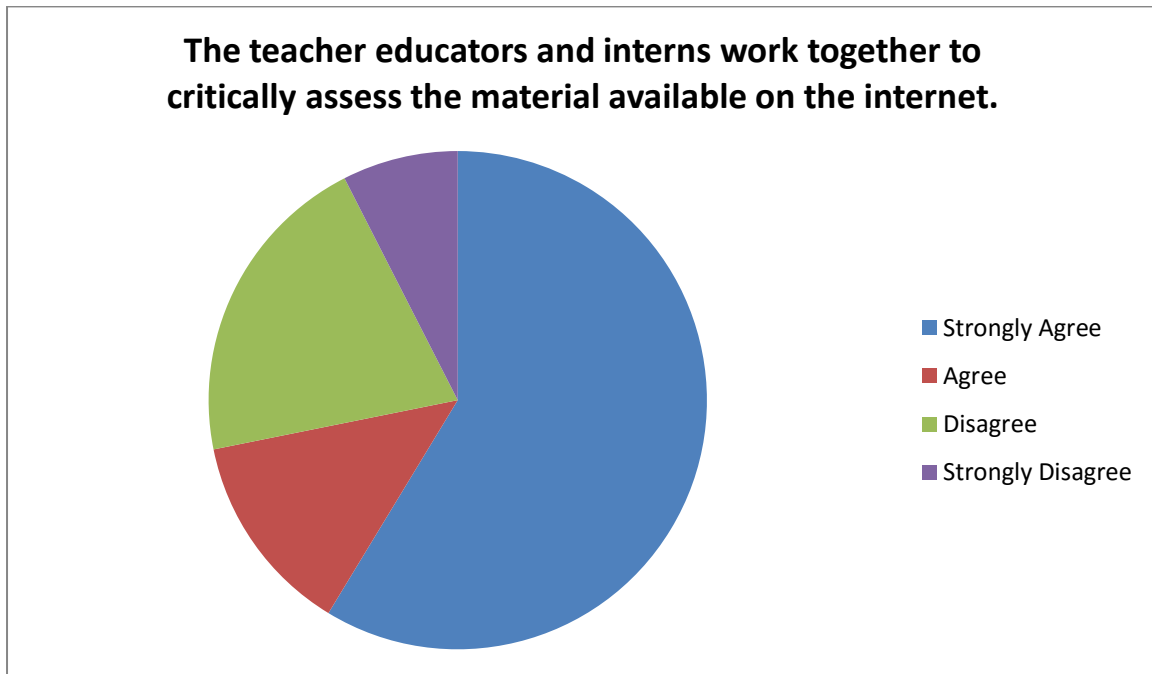**The program has space for the interns to evaluate and integrate available ICT material of different subjects.**

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

Figure 3

The program incorporates use of computers to create ICT material that can be used in the classroom.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

Figure 4

The teacher educators and interns work together to critically assess the material available on the internet.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

Figure 5

Teacher educators and interns use technology (wiki, Blogs) for creating an interactive platform for intern queries and feedback.

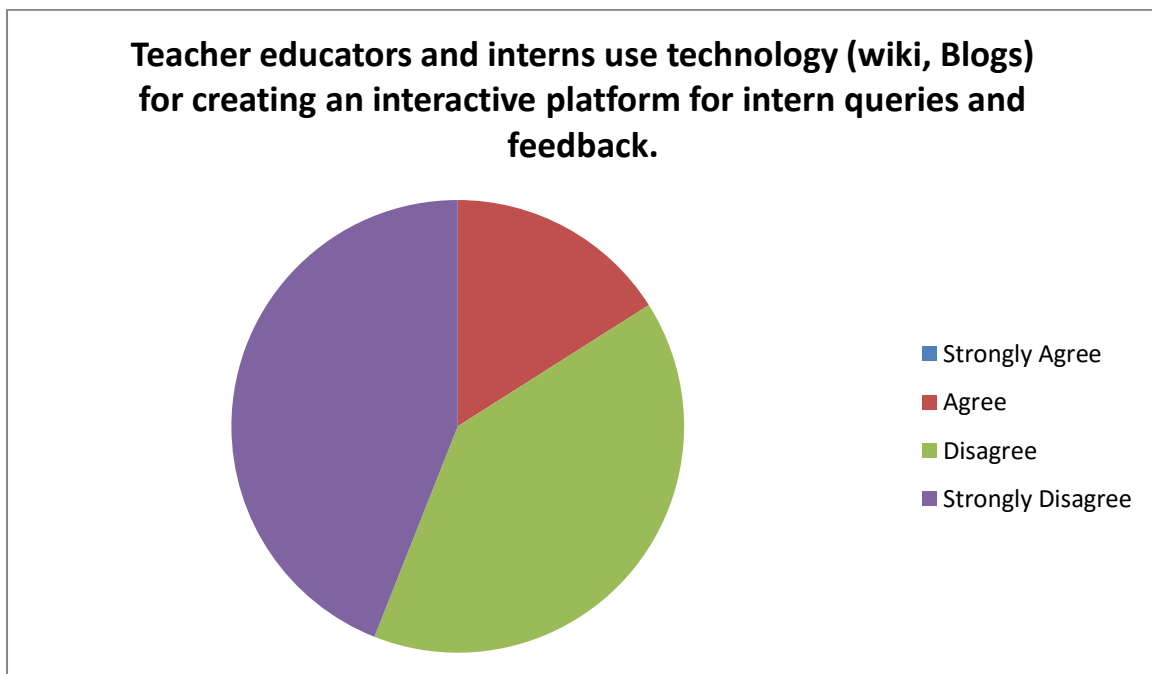- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

Figure 6

Figures 3 to 6 show an overwhelming tilt towards negative responses. Respondents have said that their program has no space to:

- Use computers for creating material for teaching;
- Allow teachers and interns to work together to evaluate material available on the internet, and
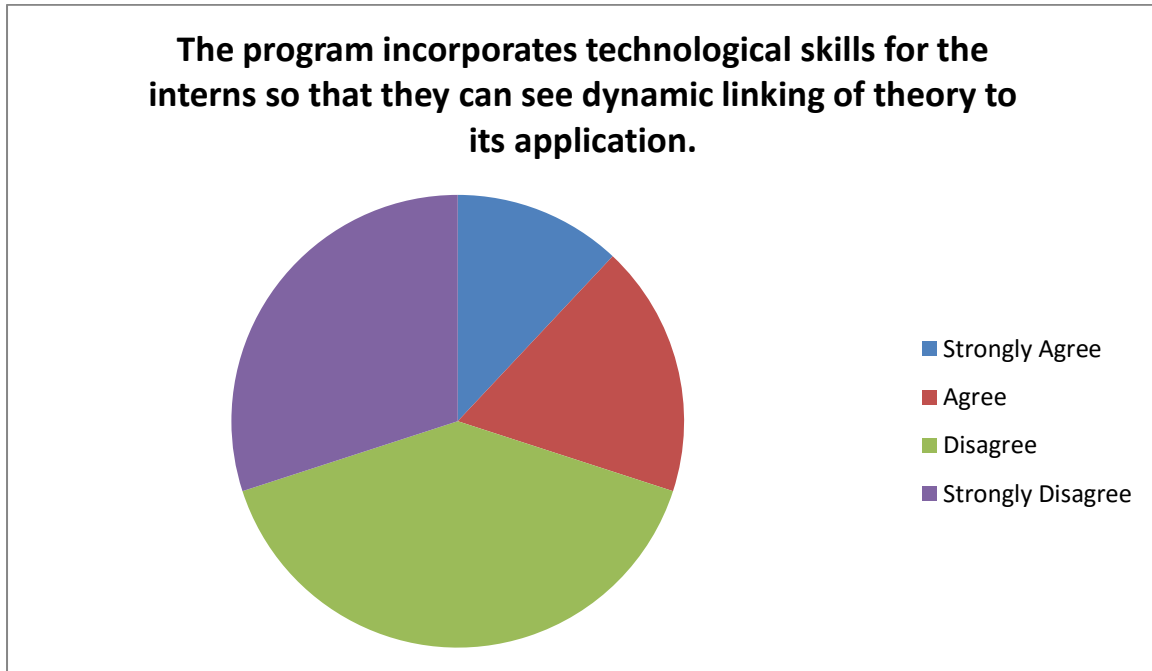- Create interactive platforms through technology.

The program incorporates technological skills for the interns so that they can see dynamic linking of theory to its application.

- ■ Strongly Agree
- ■ Agree
- ■ Disagree
- ■ Strongly Disagree

Figure 7

The teacher education program goes beyond preparing teachers for traditional stand-alone, text based instruction in self contained classrooms.

- ■ Strongly Agree
- ■ Agree
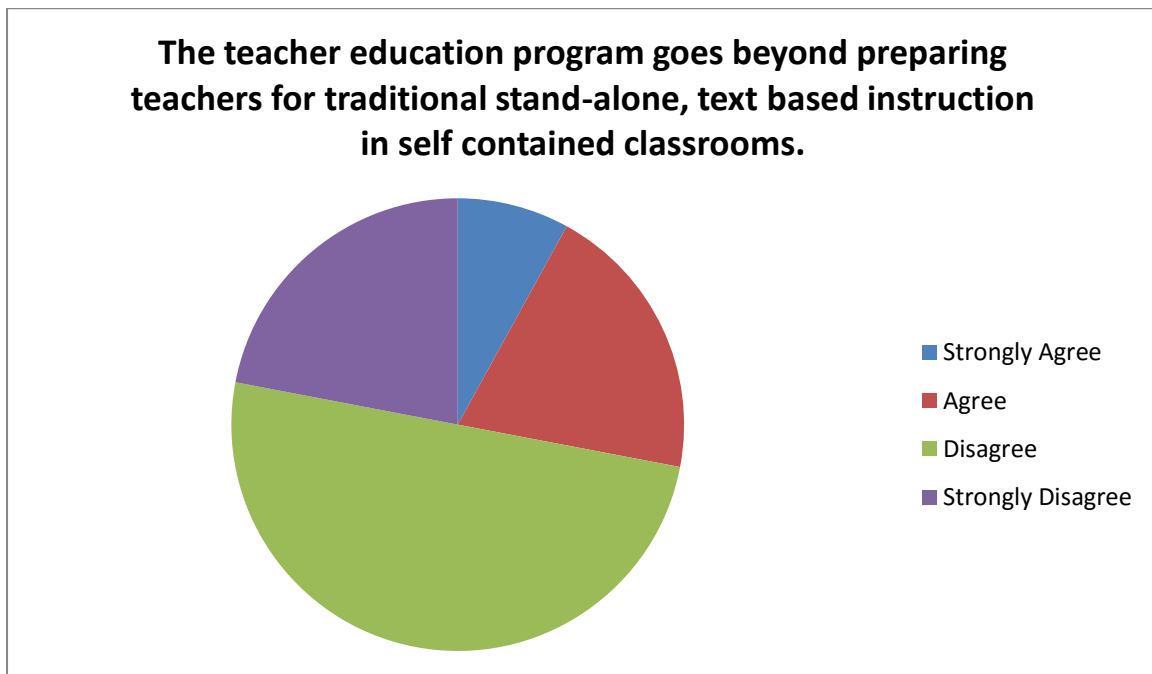- ■ Disagree
- ■ Strongly Disagree

Figure 8

The responses to question 7 and 8 shows a marked skewedness in favour of the use of technology (see figures 7 and 8). There is no module to teach the use of technology and to create original material with it in teacher education. Then why does the analysis show skewed responses? The researcher was prompted to raw data as being a teacher educator oneself, it was known that there is no module in DIET, B. El.Ed, Or B.Ed. to teach the use of technology. But M.Sc. Mathematics Education program was not a course familiar to the researcher. The responses of the respondents were reviewed and the positive responses were of the M.Sc. Mathematics education students. The next step was to get a better understanding

of the program. It was clear that M.Sc. Mathematics Education was a newly conceptualized course with greater academic and technological review rigour. The students were taught how to create technologically-based learning material.
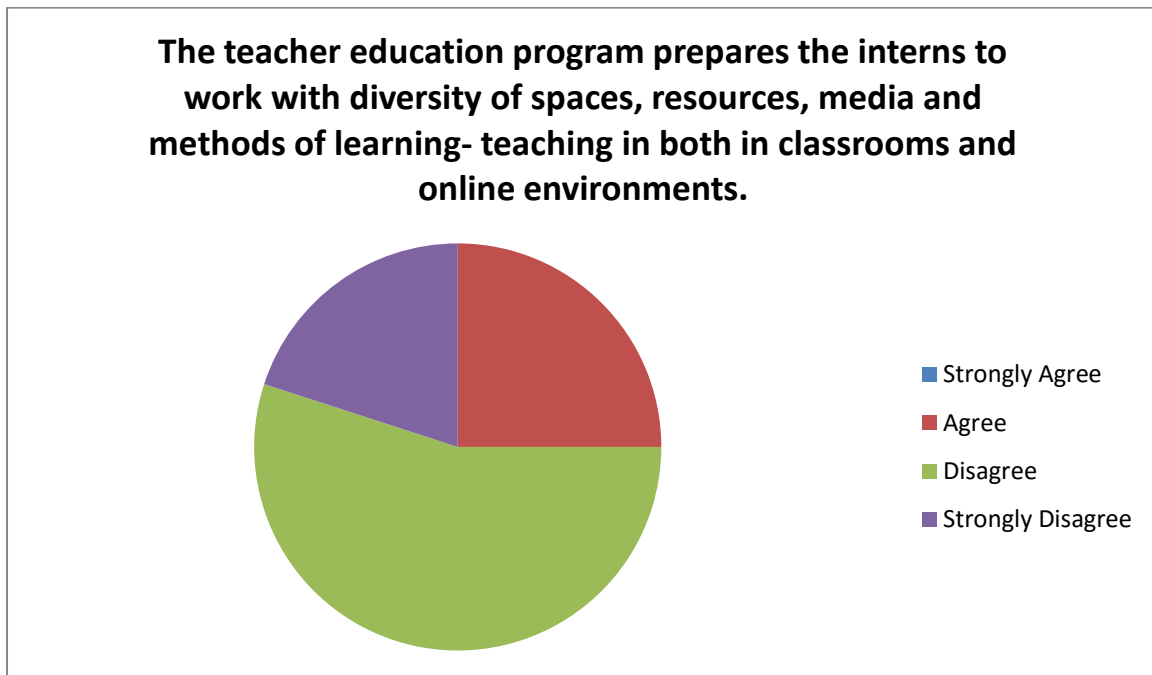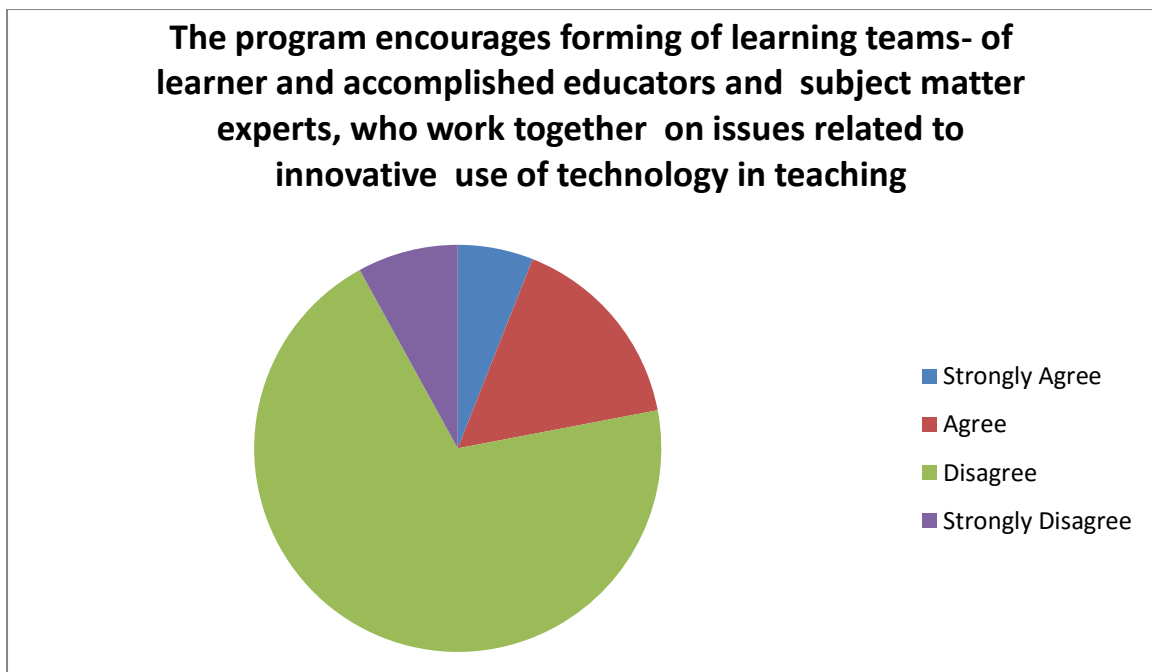

Figure 9

Figure 10

Figures 9 and 10 indicate a decided lack of collaborative efforts and opportunity for working in blended environments. There is an apparent lack of appreciation of nuances of a digital learning space.

The responses show an inherent paucity of efforts in aligning teacher education to the needs and trends of the digital age. Though teacher education programs use video clips and

movies to enhance teaching or schema activation, nothing original is created by teachers or interns to use in their classes. Powerpoint presentations are also made by teachers and interns, but there is no manifestation of creativity. These attempts were motivated by the original teachers' personal passion. The use of technology is not an inherent part of the program itself. Technology is not a part of the teacher education program in Delhi, either in strategy or content, except in M.Sc. Mathematics Education.

Conclusion – The Road Ahead

The careful study and analysis of the responses to the questionnaire clearly indicates that there is an urgent need to create space within the prescribed curriculum of Teacher Education courses in India. The rationale behind creating the novel learning space is that interns can learn the usage of technology and how to create original teaching learning material to be used in the classroom in that format.

Understanding the principle of using technology can help broaden the minds of the teacher and teacher educator, to the possible of elimination rote learning and drill, thereby creating room for creative discourse between teacher educator and intern, to be followed by similar interaction and learning between teacher and learner in the school classroom.

Technology needs to be taught through workshops, collaboration and interaction, which will help foster practical transaction of technology. It is not theory that has to be understood and learnt, but the confidence to tinker and tweak technology and customize it for individual needs. More importantly teachers and teacher educators need to understand that the journey of integrating technology with pedagogy is not a utopian dream. A teacher needs to weave a detailed plan with technology integrated strategies. Using technology without appreciating its nuances and mathematical basis will not yield viable results.

Administrators need to understand the imperatives of technologies, while initiating changes in education. This environment will facilitate the evolution of our digital immigrant learner into a digital native. This is a prerequisite if we want learning to be effective and learners to become efficient citizens.

We all know that India is a cash strapped nation, but that does not take away from teacher education needs to be aligned to the needs and trends of the technological age. Only then will our young citizens develop minds, open to change. Traditional text based classrooms are not preparing learners with open and receptive thinking which is essential for a nation's progress. We do have access to technology in India, but it will only remain a statistic if the citizens who can use it don't have open and flexible minds.

The Indian, socially conscious corporates and innovators like Ratan Tata and Sugata Mitra are showing the way in which technology can be integrated in our lives followed by education, thus opening the minds of our young citizens to embrace, in the words of Aldous Huxley," …. The brave new world".

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