The Role of Technology in Improving Education in the 21st Century

Mohammad Sadik, Ph. D.
Salahaddin University

Kirmanj Gundi, Ed. D.
College of Education
Tennessee State University
Nashville-Tennessee

and
Narin Maiywar
Salahaddin University

Abstract

Since the 1920s, the gradual development of technology has played a crucial role in improving educational settings. Educators over the years, through technology, have been able to develop a better understanding about various elements of the instructional strategies that have motivated students in the learning process. In the last three decades, computers as collective resources, including computer-based support system, instructional system, and media have been utilized to enhance the educational environment more than ever before.

The use of educational technologies provides the skills required for preparing students to function properly in the real world. Such technologies set new academic requirements to transform educational programs to a higher level, where the learning environment would embrace the rapidly evolving world into a new information age.
This promotes the educational themes by designing new learning techniques.

Teachers also need to demonstrate knowledge and skills relevant to the technological growth and its continued impact on improving their professional and task-oriented practice .

21st century classrooms should be transformed into smart classrooms, where students have easy access to interactive technologies and Internet to advance their knowledge .

Introduction

Since the early years of the 1920s, the gradual development of technology has played a crucial role in improving educational settings (Roblyer and Edwards, 2000). It has helped educators to create instructional planning to support and facilitate the teaching and learning process. Educators over the years, through technology, have been able to develop a better understanding about various elements of the instructional strategies that have motivated students in the learning process. The microcomputer supremacy has facilitated the use of instructional technology, and due to its user-friendly nature the use of instructional technology has grown improving education. In the last three decades, computers as collective resources, including *computer-based support system*, *instructional system*, and *media* have been utilized to enhance the educational environment more than ever before. Such a technological evolvement has transformed the instructional advancement to a higher and more intricate level (Anglin, 1995, p. 16-18).

The use of educational technologies provides the skills required for preparing students to function properly in the real world. Such technologies set new academic requirements to transform educational programs to a higher level, where the learning environment would embrace the rapidly evolving world into a new information age. For students to progress in the 21st century, such an environment must be future oriented. It should be a place where they are encouraged and helped to synthesize their academic and scientific abilities in order to be productive in the new century. Educational technology as a tool has been consecrated to develop new discoveries in the new era using theory and practice to create, facilitate, manage, utilize, and assess the methods of teaching and learning and provide more opportunities for educators to use the instructional applications with more clarity to promote the educational themes by designing new learning techniques. (Gundi, 2004).

Teaching in the 21st century requires educators to utilize technology to plan an instructional opportunity that include both new paradigm and new initiatives in order to deliver the quality education needed for students to stay abreast with the rapid changes that take place around them. Teachers also need to demonstrate knowledge and skills relevant to the technological growth and its continued impact on improving their professional and task-oriented practice (Tucker, 2005).

21st century classrooms should be transformed into smart classrooms, where students have easy access to interactive technologies

and Internet to advance their knowledge base through individual and collaborative work in class or with other students from a distance to increase their awareness about the future needs and expand the horizon of their thoughts through new discoveries and promote human potentiality to secure a safe and prosperous future where humanity and human oneness would flourish (Wanak, 1999).

Starting with Technology

In the last 30 years, school systems across the nation have poured millions of dollars into the education system in order to furnish schools with the state-of-the-art technology, but time and again without a valid schematic representation of a structure to indicate how their utilization would affect the teaching and learning environment. The use of technology is not about hardware components or its assembly, it is about integrating it with the curriculum to advance the instructional settings. Students should be guided to use technology to broaden the scope of their logical thinking and deepen their academic and scientific understanding to widen their viewpoint about the globe they live in (Barnett, 2001).

Up until 1980s, the limited abilities that a literate individual had and evinced were enough for distinguishing differences between *skille*d and *unskilled* workers. In basic education, perhaps only rudimentary training was needed. Now, at the onset of the 21st century the concept of literacy has changed dramatically. *Computer literacy* has become essential in order to operate successfully in the workplace. Such literacy requires *graphic* and *visual* abilities. Students are required to become computer savvy if they are to succeed in the information age. Through the use of technology, students would be able to conduct and promote critical thinking, crucial analysis, and communicate more effectively. Due to the rapid acceleration of technology and ever-broadening knowledge base, the information that students would have to access would double in two and half years. This indicates that by the time first-grade students complete high school the knowledge base would *quadruple* (Bitter and Pierson, 2002, p. 2)

The advancement of technology has made the transformation and accessibility to information in any academic field much easier. It helps students to share information, and work cooperatively on various projects. The information age has brought the world to live with the biotechnological advancement in which every progress is based on mind and life. The mind, at this stage, requires students to be savvy and competent, innovative and critical thinkers. Therefore, they should be able to independently gather and disseminate information creatively in order to stay abreast with new changes that take place around them. In today's complex world, perhaps students have fewer options to choose

from, consequently, they have to be apt to fully involve themselves with technology to critically analyze information and conclude viable outcomes. They need to be skillful enough to communicate their thoughts to construct new knowledge and expand their creative ability to create a better life for themselves and try to make a better environment for others around them (p. 3).

Where should we start with the use of technology to promote the quality of teaching and learning has usually been a challenge! How teachers and students utilize computer technology to identify opportunities and problems according to their needs and wants brings about a realization that at the inception of our academic journey we should teach students the *input-compile-output* process, and gradually advance their technological skills to learn the logic and rationale behind the usage of such an efficacious engine in order to advance their learning ability and eventually fulfill the maximum societal requirements (Bussey, Dormody, and VanLeeuwen, 2000, p. 4&5).

Considering the fact that the computer technology has dominated almost all the compartments of humanities, and at the educational level it has become the most reliable and efficient tool for educators to guide and enhance the quality of their scientific and scholarly work, it is essential for educators and students to employ technology and establish a symmetric channel to send and receive anatomized data more sufficiently and effectively (Brown, 2001). In the last two decades computer technology has drawn greater attention as a necessary means not only in general education, but also in every aspect of human society. This brings the technologically savvy educators to acknowledge that technology should not be taught as a separate subject, but rather as a general utensil in the curriculum to assist students to perform with more genuineness in all subject areas (Bungum, 20005). It is pivotal that technological expertise reaches all students at all levels of academe.

In today's information and complex world, the future does not lie in the hardware technology, but in the ability of those who understand and know how to use it. Since technology has already emerged as a crucial component in academic field, the technologically equipped educators should aver that students at all grade levels must be familiar with and use computer technology to strengthen their thinking ability by utilizing it for gathering, analyzing, and disseminating information to construct and conclude logical results (Bussey et al, 2000).

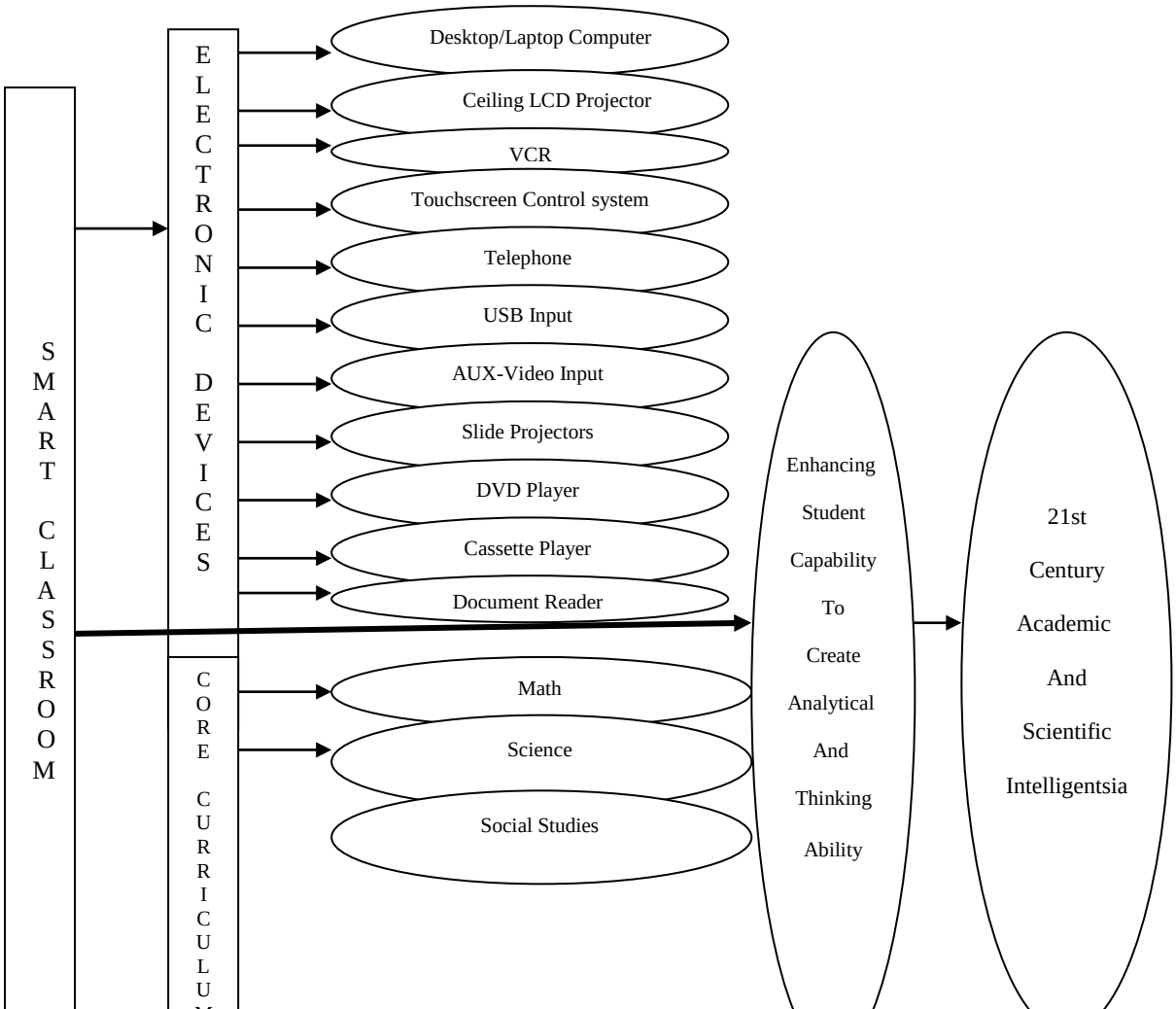
Computer technology helps teachers as well as students to address problems and opportunities in a fashionable manner, and plan to develop professional approaches to demonstrate knowledge and skills required to successfully operate in the technologically complex 21st century, where things change rapidly around us. Therefore, students must be guided to

enter through, as Barnett stated, five stages, "Entry, adoption, adaptation, appropriation, and invention," and of course, the evaluation and assessment procedure must follow to ensure the quality outcomes. At the entry level the needs for technological proficiencies must be addressed to clarify the expectations that both teachers and students have to demonstrate in order to practice their academic ability to innovate creativity and critical thinking. This process must be synthesized with the use of appropriate resources to provide continuous support to maintain the desire for renewal procedures to stay abreast with latest changes and inventions (Barnett, 2000).

Smart Classroom

A smart classroom is also known as *technology enhanced classroom* (Northern University, Website, 2004). It is a user-friendly environment conducive to effective teaching and learning phenomenon (Johnstone, 2002). It is equipped with *networking, digital, and visual technologies* (Northern University, Website, 2004).

A smart classroom is comprised of a program that includes the core curriculum and latest technologies. On the technology end, a smart classroom introduces students to various forms of technologies, such as, *multi-media*, *databas*e, *visual devices*, *satellite TV*, *distance learning*, *instant Internet access*, and *instructional software*. These applications provide students with outstanding opportunities for effective learning and expanding their knowledge base. In such classrooms, teachers employ andragogical methods of teaching, where they act as facilitators and promote individualized learning opportunities by adapting the needs of every student (Phuc H., Elysse E., Mercedes H., and Samantha G., Website, 2005). On the curriculum end, it enables students to, 1) learn and demonstrate knowledge, skills, and applications about various technological strategies, 2) apply knowledge and skills of technologies and evaluate their impact on academic improvement, 3) demonstrate the *ability* to use technology for problem solving, individual work, and collaborative projects, 4) apply ethical values when using technologies to make decision, gather, analyze, and disseminate information, 5) demonstrate the technological conceits to comprehend all the related subject matters to practically and pragmatically expand student abilities, 6) apply moral standards to create equal opportunity for all students to close the gender gap and enhance women's abilities to exercise their talented brain power, and 7) demonstrate competencies to improve intrapersonal and interpersonal skills of human beings to improve their social and economic status (Darrow, 1998). *Below shows a general concept of a smart classroom.*


SMART CLASSROOM
ELECTRONIC DEVICES
Desktop/Laptop Computer
Ceiling LCD Projector
VCR
Touchscreen Control system
Telephone
USB Input
AUX-Video Input
Slide Projectors
DVD Player
Cassette Player
Document Reader
CORE CURRICULUM
Math
Science
Social Studies
Enhancing Student Capability To Create Analytical And Thinking Ability
21st Century Academic And Scientific Intelligentsia

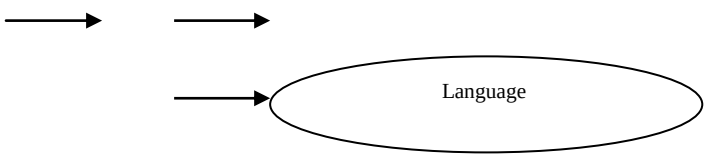


Figure 1- Illustrates Smart Classroom Configuration

In a smart classroom, it is easier for the instructor to work with each student based on his or her learning style and facilitate the knowledge dissemination process. Individual students have a better opportunity to work cooperatively, because they have more freedom to move around the class and exchange ideas to learn from each other and view new learning experience from different perspectives (Stewart, 2001). This requires, at the onset of the course that students be oriented and trained for appropriate utilization of the classroom technologies (Instructional Media Services, Website, 2005), to discuss the most crucial and contemporary issues as they emerge. This enables them to synthesize knew information with their knowledge base to create new ideas and add more to their creative ability (Marquez, 2000).

In a smart classroom, because it is an active classroom, students and instructor are always interacting and engaged in a close working relationship, which promote a live learning environment. Students will have immediate feedback from the instructor and fellow classmates for better understanding to verifying the validity of their work (Jordan, 2002). *Below is a layout of the smart classroom* (Johnstone, 2002).

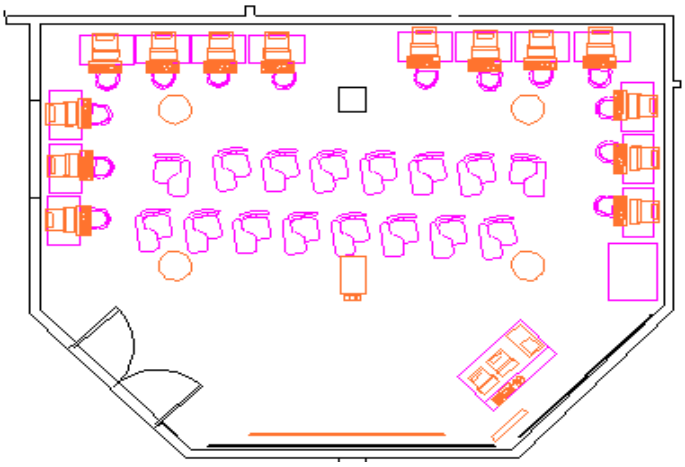


Figure 2- A layout of the smart classroom

Teachers in the 21st Century

The digital technologies in the 21st century provide educators and students with unprecedented capacities to elevate their abilities to make the kind of changes that impact the teaching and learning criteria (Sweder, 2002). This criteria acknowledges the necessity that well educated and trained teachers will be able to improve student achievement to perform successfully in the new century.

The form of instruction in this century must not fall short in providing students with opportunities that would enable them to investigate and experience the real-world knowledge. This should enable them to gradually conceptualize the real world in its entire complexity to develop and enrich their own perception about the globe they live in (Taylor, 2005). It is pivotal for educators in the 21st century to acknowledge that teaching in this century would not be an easy task in order to preserve prosperity of the nation's future. Educators must realize that the tranquility of the future is well defined in the hands of the products they produce. Therefore, to provide the availability of such high quality teachers, it is crucial that the nation reevaluates the teacher preparation program across the country to ensure the maximum standards to guarantee the high quality teacher training is met to safeguard student success in the information age. Teachers must use active learning to engage students with learning activities where they eventually become independent learners. Teachers must give close attention to different *learning styles*, and *multiple intelligence theory* in classroom to meet the needs of the different learning style of each student. Interdisciplinary instruction is another crucial component, which should be employed within the teaching and learning frame of reference in the 21st century to give students fair chance to explore and expand the critical thinking skills to develop necessary problem solving abilities to promote their living standards and enhance the quality of the natural environment (Education Today, Website, 2005). *Below explores new paradigm for teachers in the 21st century.*

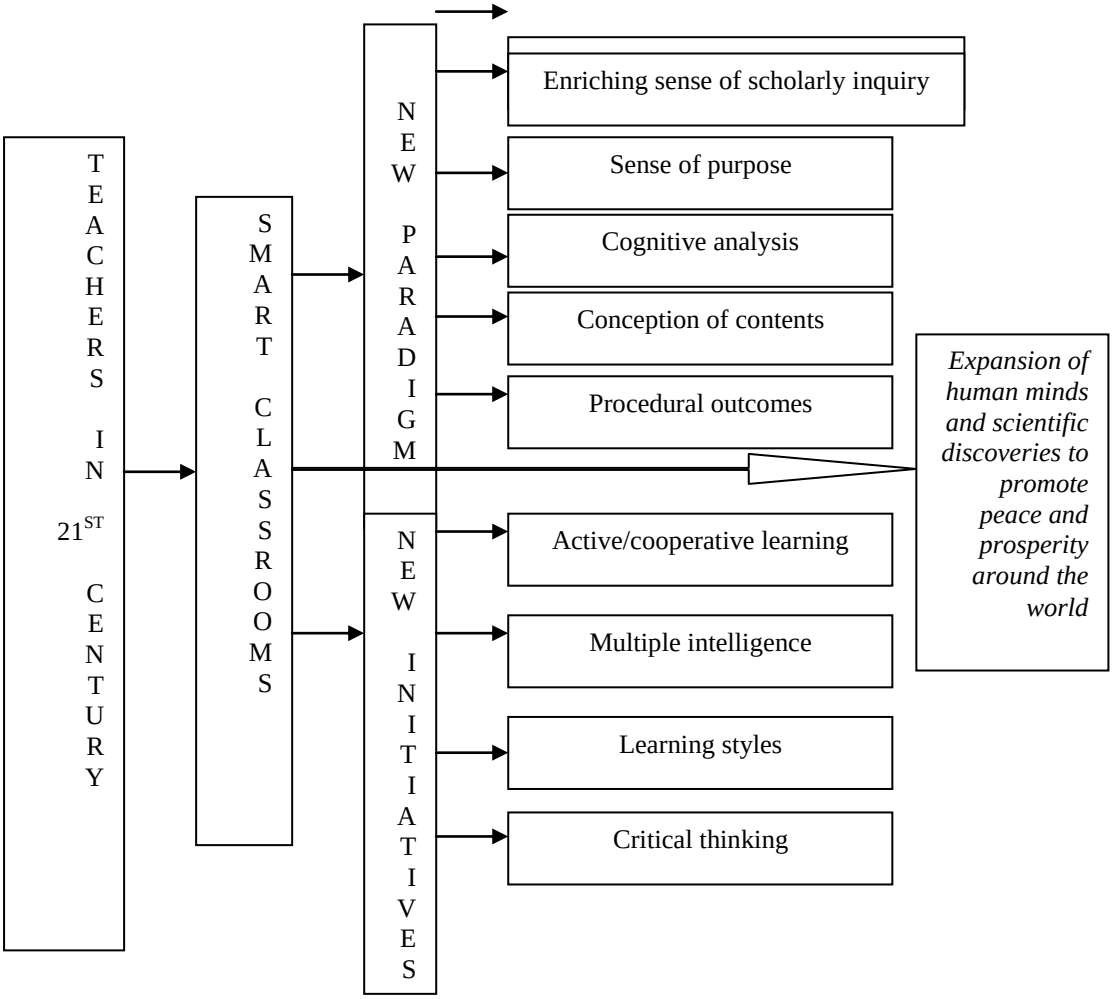


Figure 3- indicates new initiatives and paradigm of teaching in 21st century

The academic and scientific discoveries in the last three decades have revealed that the use of educational technology applications have enhanced all the content areas of the curriculum, and provided students with a better opportunity to enrich their view of the world (Bussey et al, 2000). Therefore, the teachers who are technologically not savvy enough and still active in classrooms need to adopt a perception that *education technology* is an essential innovation and must be perceived as a necessity and infused into educational disciplines to create the technological experiments that would challenge students across the curriculum to work together and share their learning experience from a distance (NSF, Website, 2005).

Teachers in the 21st century have a little or no choice but to advance their technological skills not only to be able to improve the teaching and learning process but also to motivate student interest and to create a creative dialogue of thoughts and experience (Walls, 2005). In the 21st century, the educational setting in its entirety will form a different paradigm. In the new century, the principle substance would be to critically compile new knowledge to make a new meaning for concept comprehension. Eo ipso, teachers must utilize technology to facilitate such progress, so that students can decipher and disseminate new information thereby creating a meaningful circulation of knowledge that enriches the new learning experience. Teachers must realize that technology will continue to attribute the quality instruction that engages students with *minds-on* activities, where they enjoy learning, because they discern how and why they have to assert the ideal understandings with regard to the issues concerning the world they live in. Therefore, teachers' expertise should be based on the skills that create an environment conducive to encouraging students to view the planet and all its living souls as a community of conjoined systems that motivate them to deeply contemplate ethical values for the 21st century, where preserving human dignity and the salvation of humanity is at the core of their academic and scientific achievements. Teachers, using their genuine pedagogical and andragogical efforts should guide students through a dialogue where human integrity and healthy environment are in a symmetric channel to preserve peace and promote prosperity across the globe (Panah, 1999).

Conclusion

Technological improvement requires educators to rethink and reevaluate their perception about their knowledge base and expertise in order to deliver better educational services. This has brought upon teachers and prospective teachers greater expectation to adapt to the changes that are introduced with the new educational and technological

challenges in the 21st century. To improve educational instruction, the quality of teachers and prospective teachers must be improved by improving the teacher preparation programs across the nation. Universities and other teacher institutes should combine their efforts to prepare quality and technologically savvy teachers (Lee, 1999).

The whole purpose of the educational technology has been to promote students social and economic status. Such a promotion has required incorporating advanced technology into classrooms where *network connectivity* is utilized to assist educators to responsibly exercise pedagogical and andragogical approaches to deliver educational technology to help students and strengthen their minds, bodies, and spirits (NSF, Website, 2005).

Educational improvement in the 21st century is a continuous phenomenon, and is only feasible when technology is taught across the curriculum with all subject matters to provide the ability students need to function successfully in this technologically advanced world.

As the world looks back at the technological advancement during the last century and glances at the dark side of technology, it realizes that the only remedy to the human suffering is a peaceful trend of using technology, and the trend should be influenced by modernity and faith in humanity and its principles to create a more prosperous natural living environment. There is no other purpose for teachers but continue to grow new knowledge, skills, and develop new flexibility to elevate students' academic performance and help them to grow healthy with a strong foundation of self-esteem, self-reliance, and self-efficiency. Students must be taught that the purpose of using technology is to better human life and not vice versa.

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نارين مايوار د. كرمانج كوندي أ.د. محمد صديق محمد
جامعة صلاح الدين الكليَّة التعليمية - جامعة ولاية تينيسي جامعة صلاح الدين

الملخص

ان التطور التدريجي للتقنيات منذ العشرينات لعب دوراً حاسما في تحسين المؤسسات التربوية . وعلى مر السنين فان التربويين ومن خلال التقنيات اصبحوا قادرين على تطوير فهم افضل حول العناصر المتنوعة للاستراتيجيات التعليمية التي حفزت الطلبة في عملية التعلم . وفي العقود الثلاثة الاخيرة فأن الحاسبات والتي تعتبر مصادر جماعية – وبضمنها نظام الدعم المعتمد على الحاسوب والنظام التعليمي واجهزة الاعلام . وقد استخدمت لتحسين البيئة التربوية اكثر من أي وقت مضى .

ان استعمال التقنيات التربوية يزود المهارات المطلوبة لتهيئة الطلبة للاندماج والتعامل بشكل صحيح في العالم الحقيقي كما ان هذه التقنيات وضعت متطلبات اكاديمية جديدة لتحويل البرامج التربوية الى مستويات اعلى والتي فيها ستقوم البيئة التعليمية باحتواء العالم النامي بسرعة الى عصر معلوماتي جديد . وهذا ما يؤدي الى الارتكاز بالمواضع التربوية عن طريق تعميم تقنيات تعليمية جديدة .

ان التدريسيين كذلك يحتاجون الى عرض المعرفة والمهارات المتعلقة بالنمو التقني وتاثيره المستمر على تحسين ممارساتهم التخصصية والتدريبات على المهمات الموجهة .

ان القاعات الدراسية في القرن الحادي والعشرون يجب ان تتحول الى قاعات ذكية والتي يستطيع فيها الطلبة التوصل مع التقنيات الفعالة والانترنيت لتسيير قاعدة معلوماتهم نحو الامام .