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Need for 21st century curriculum

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Abstract
To meet the demands of the 21st century, students need to know to use their knowledge and skills-by thinking critically, applying knowledge to new situations, analyzing information, comprehending new ideas, communicating, collaborating, solving problems, and making decisions. This study emphasizes the importance of incorporating ICT into education from the lower grades up towards learning for the 21st Century & also points that the curriculum must connect the students' academic learning experiences with the world beyond the class room. The present study deals with the teacher perspectives on the design of the curriculum for the present day and emphasizes the fact that the curriculum must incorporate multiple literacies, promote inventive thinking & active learning and must also address student diversity. As per this study, majority of the educators are of the view that education and curriculum of 21st century should be based on critical thinking and problem solving, quickness and adaptability should also be its basic instinct.

Keywords: curriculum, multiple literacy, critical thinking, active learning, integrating curriculum, student diversity

1. Introduction
21st century skills make the student as a collaborator & a communicator. Technology and information literacy play a large role in this development, but it is by no means comprehensive. Students will have opportunities to solve problems creatively, adapt to cooperative learning approaches, and develop their own understanding of the world. The 21st century curriculum & instruction deals with skills discretely in the context of core subjects and interdisciplinary themes which focus on providing opportunities for applying these skills to a competency- based approach to learning. These may enable innovative learning methods that integrate the use of supportive technologies, inquiry- and problem-based approaches and higher order thinking skills.

2. Review of Literature
Curriculum is essentially a design, or roadmap, for learning, and as such focuses on knowledge and skills that are judged important to learn. Schools need to adapt 21st century curriculum that blends thinking and innovation skills; information, media, and ICT literacy; life and career skills in context of core academic subjects and across interdisciplinary themes, and to employ methods of 21st century instruction that integrate innovative and research-proven teaching strategies, modern learning technologies, and real-world resources & contexts.
Sternberg (2006) [1] of Tufts University has called for a curriculum that centers on developing student competence in what he calls "the other 3 R's." In this case, the R's stand for Reasoning, which include analytical, critical thinking, and problem-solving skills, Resilience, which encompasses life skills such as flexibility, adaptability, and self-reliance, and Responsibility, which Sternberg links to wisdom, which he defines as "the application of intelligence, creativity, and knowledge for a common good." Wagner and Robert Kegan (2006) [2], co-directors of the Change Leadership Group at Harvard University, recommend a curriculum built on a different set of "new 3 R's"-that is, Rigor, Relevance, and Respect. The Change Leadership Group's 3 R's address instructional approaches, while Sternberg's R's are framed as student outcomes. Rigor, for Wagner, *et al*, does not mean content that is difficult for students to master; rather it concerns what students are able to do as a result of their learning. Relevance means helping students understand how their learning connects to their further studies and future work settings. Respect means promoting respectful relationships between and among teachers and students that foster academic and social competence. Other notable curricula have been proposed by Harvard researcher Perkins (1989) [3], who has long advocated that thinking skills be taught as a "meta curriculum" intertwined with traditional core subjects and urged schools to adopt "a thinking curriculum – one that provides a deep understanding of the subject and the ability to apply that understanding to the complex, real-world problems that the student will face as an adult." Lim (2016) [4] have stated in their article that the quality of any education system is significantly dependent on the quality of teachers in that system. A 21st century teacher professionalism requiring specialist knowledge and skills is essential for ensuring the quality of teachers. Associate Professor Barbousas (2018) [5] says 'a teacher needs to be able to adapt those imperatives of literacy and numeracy skills and the various social and cultural needs in various contexts.

3. Rationale
Students, who are given the chance to collaborate through well-organized learning projects, will stay engaged in the learning, will feel committed to the learning team, and will demonstrate their learning in practical application that allows them to transfer learning to the next level and beyond school. Students can use digital tools to share information across geographic barriers and also to identify with communities beyond their own to think globally. The state level schools

are established in order to provide access for all children to primary school or are equivalent non - formal education. The main objective was to reduce overall dropout rates, increase average learning achievement levels and reduce gaps in enrollments, dropouts, and learning among gender and social groups. The major factors of the state level education are the community mobilization and participation, text books based on minimum levels of learning with the stress on the availability of books in local languages. In order to achieve these objectives, it becomes important to design a curriculum which can make the students more participating & objective oriented as well multi - dimensional thinkers.

Let us first examine how our school curriculum is designed for students for life and work in 21st century

a) Present curriculum often is dominated by contents of factual and procedural knowledge, at a time when it is imperative for students to apply deep understandings of key disciplinary concepts and principles to solve real-world problems.
b) School subjects are taught and designed in isolation from each other, at a time when solutions to societal challenges and the nature of work are becoming increasingly cross-disciplinary.
c) School curricula often emphasize reproductive learning and the solution of stereo typed problem, at a time when there is a growing need to promote creativity and the ability to develop innovative solutions to entirely new and complex problems.
d) Assessment procedures in educational institutions – especially in the senior secondary schools tend to provide information about subject achievement only, at a time when employers are seeking better information about students' abilities to work in teams, use technology, communicate, solve problems and learn on the job.
e) Students often learn in isolation and in competition with each other, at a time when workplaces are increasingly being organized around teamwork which require good interpersonal and communication skills.
f) Present School curricula is designed for delivery in traditional classroom settings, at a time when new technologies are transforming how courses are delivered and learning takes place.

This present study focuses on a survey of teachers on the much-needed curriculum with 21st century skills. This paper is written on the responses on the needed nature of the curriculum and also includes few recommendations for the implementation of this curriculum.

4. Objectives of the study

1. To understand the need of a curriculum which includes 21st century skills needed by a student
2. To understand the teacher's perspective in the design of a curriculum with multiple skills

5. Limitations

The study is limited to the responses given by teachers of Hyderabad, India and also simple statistical tools were employed in analyzing the data. This study may give us a broader idea of teachers' input into the design of curriculum.

6. Sample

The sample for this study was comprised of 200 educators (Men=112 and women=88) randomly drawn from different schools in and around city of Hyderabad, India. Educators' age ranged between 25-55 and their experience between 5-25 years. They were selected from all courses of study.

6.1 Tool

The article survey was developed by the Authors and focuses on the factors influencing the implementation of curriculum and also on the outcomes on teacher participation in curriculum development procedures. It consists of 20 questions, with scoring on a 5-point scale consisting of Strongly Agree (4), Agree (3),), Disagree (2), and "Strongly Disagree (1). The data was analyzed using statistical tools like mean, SD and variance and chi square test.

6.1.1 Hypothesis

There is no significant impact of development of 21st century skill based curriculum on the student performance.

Table 1: Demographics of participants

	Independent variable	Frequency
Gender	Men	112
	Women	88
Age	25-35 years	24
	35- 45 years	141
	45 – 55 years	35
Core	Science	96
subject	Math	24
area	Social studies & ICT	60
	Languages, Arts	20
	5- 10 years	21
	11- 15 years	84
Teaching	16 – 25 years	95
experience		

Table 2: Educators' perception on the nature of curriculum - responses

S. No.	Variable	Mean	SD	Variance	SA	A	D	SD
1	Research driven and promotes active learning	3.54	0.18	0.02	160	22	12	6
2	Connected to students' interests	2.87	0.21	0.59	112	43	28	17
3	Incorporates multiple literacies	3.65	0.19	0.03	126	60	10	4
4	Promotes inventive thinking	3.86	0.20	0.04	140	54	6	0
5	Promotes effective communication	2.85	0.24	0.05	90	64	32	14
6	Complement various teaching methodologies	2.99	0.26	0.66	108	52	38	2
7	Nurture a sense of appreciation, enjoyment and critical vision towards creative learning	3.36	0.17	0.02	118	56	18	8
8	Address student diversity	3.18	0.16	0.02	121	46	29	4
9	Learning is designed on upper levels of Blooms' taxonomy	3.2	0.12	0.01	136	32	22	10
10	Incorporating technology	3.42	0.19	0.03	129	48	18	5
11	Integrating Curriculum	3.57	0.18	0.03	126	57	12	5

7. Results & Discussion

- Inventive thinking must be developed among the students to develop the ability to encounter difficulties, willingness to take risks to solve a problem, curiosity and also sound reasoning to defend and evaluate their work. High productivity skills allow the students to organize and prioritize tasks. Also, they have to be trained in using real world tools to complete tasks and produce products that are authentic and useful and be able to present using variety of multimedia technology. The curriculum must open up an exciting journey of inventive thinking and problem solving. According to enGauge (2002) [6] 21st century skills, inventive thinking is comprised of adaptability and managing complexity, self -direction, curiosity, creativity, risk taking, higher order thinking and sound reasoning. Adaptability and managing complexity of inventive thinking skills refer to the ability to handle multiple goals, tasks, and inputs, while understanding and adhering to constraints of time, resources and systems. In a study conducted by Sokol (2008) [7] in Lativia, into the efficacy of the Thinking Approach (TA) to language teaching and learning, which is aimed at the development of upper secondary students' inventive thinking skills in the context of foreign language education, has found that the students working with the TA demonstrate a significant increase in their inventive thinking skills. In the present study, 95% of the respondents felt that the inventive thinking strategies must be incorporated in the curriculum, which also generates an interest in the teacher to perform better. The students understand the rationale behind their study and try to achieve maximum success. This variable has a mean of 3.86 and SD of 0.20. The entire subject teachers have agreed that a curriculum developing thinking skills is the most sought-after need of the times which prepares the Indian students to face the global challenges.
- All curriculums must be designed such the students can become responsible adults, effective contributors, successful individual who can take tasks with confidence and ease. One of the best methods in schools to be adopted is Active learning and is a method of educating students, making them to participate in class and take them beyond the role of a passive listener. This type of learning can encompass a variety of techniques that include small group discussions, role playing, hands-on projects, and teacher - driven questioning designing own projects etc. The goal is to bring students into the process of their own education.
- Bonwell and Eison (1991) [8] has written that strategies that promote active learning have five common characteristics. 1) Students are involved in class beyond listening. 2) Less emphasis is placed on transmitting information and more emphasis is placed in developing the skills of the students. 3) The students are involved in higher order thinking such as analyzing, synthesizing, and evaluation. 4) The students are involved in activities like reading, discussion, and writing. 5) Finally, greater emphasis is placed on the exploration of student values and attitudes.
- According to Johnson and Smith (1991) [9], When engaged in cooperative activities, individuals seek outcomes that are beneficial to themselves and to all other members of the group. Cooperative learning is the instructional use of small groups so that students work together to maximize their own and each other's learning. (pp. 3). Active learning can also overcome the individualistic and competitive nature of traditional education. Active learning requires a lot of work and a clear objective for it to work. Using active learning for the sake of active learning may backfire. Wrote Allen (1995) [10], "One caution cannot be overstated: incorporating active learning techniques must be purposeful to carry out specific and important objectives, and must require students to use the higher order skills of analysis, synthesis, and evaluation. Anything less and your students will consider your classes to be busy work - gimmicky and worthless." (pp. 99).
- The world is becoming more dependent on technology every day. Incorporating technology into a classroom helps prepare students for the future. Yet most schools lag far behind when it comes to integrating technology into classroom learning. Many are just beginning to explore the true potential that technology offers for teaching and learning. Properly used, technology will help students acquire the skills they need to survive in a complex, highly technological knowledge-based economy. Most of the respondents felt that the schools need to enhance the technology in the classrooms by having interactive technology software, smart boards, and instruction using audio visuals as well allowing the students to attempt online examinations. Effective technology integration must happen across the curriculum in ways that can enhance the learning process. It must support four key components of learning: active engagement, participation in groups, frequent interaction and feedback, and connection to real-world experts. Teachers in the present study felt that use of e books, interactive white boards, and interactive labs, like math labs, can increase student participation and help them to get out of monotonous blackboard teaching. They also expressed the fact that the student potential can be rightly geared in a positive direction thus producing desired results. This variable has a mean of 3.42 and SD of 0.19.
- Quality written & oral communication are necessary in school and in society which needs to be emphasized across the curriculum. In a classroom, the teacher may adapt to variety of interactive teaching strategies like Literature - based activities, brainstorming activity, role playing which may include both interactive and individual, organizing seminars etc. These activities will help the students in gaining knowledge and improving their confidence. Classroom conflicts can be easily resolved with proper communication, which may result in the improvement of student behavior. Linguistic and communicative contents in the curriculum will promote communicative competence. Communicative competence and methodology have been advocated by many linguists as a way out of the defects of the structural methods which had failed to make the learners of English as a second language competent enough to use the English language for academic purposes. Also, Nwoke (1987:11) [11] posits that the overall aim of language teaching is to create in the learner a capacity to communicate in the target languages. Therefore, educators have to subscribe to the selection of curriculum contents, teaching approaches and methods that agree with the learners' linguistic, cultural and geographical environment, their needs and interests as well as the goals of the target

language in order to inspire, promote and bring out the learners' linguistic and communicative tendencies. The educators participating in the study recommended that a critical re-appraisal of the curriculum should be done, especially in the aspects of contents, textbooks and methodology of achieving communicative competence. Also, few educators expressed the idea of having communications curriculum for high school students either by integrating with language curriculum or as a separate course.

- Also, introducing novel reading into the curriculum will enhance the literary habits of the students. Using novels as the literary text in class would open many new avenues of teaching learning methods. The educators get into the substance of the book and help the students understand what it is they are reading. Through questions and discussions, they help them form their own opinions about events unfolding in the book, make predictions, write diary entry, record journals, write letters and essays - in short, with a novel study the educator can cover all Language Arts as well as literary study outcomes. With the introduction of child appropriate novels in classroom we can use the two pedagogically effective approaches which have been popular in language/literature teaching: the "Story Grammar Approach" (SGA) and the "Reader Response Approach" (RRA). Some English teachers use graphic novels to teach literary terms and techniques such as dialogue. Graphic novels can also inspire writing assignments. Other subject areas can benefit from the graphic novel, including art, science, and even math. Most of the educators in the present study expressed that graphic novels appeal to a generation of children and their inclusion in English language arts classes is a wonderful new way to engage reluctant readers. Imam (2016) [12] have expressed that social studies (SS) should make innovations related to changes of 21st-century skills and learning paradigm, which is characterized by the principles of disclosure of information, computing, automation, and communication, meaningful, powerful, value-based, challenging, and active.
- Most faculties would agree that academic success should be measured not just in terms of what students can remember, but what students are able to do with their knowledge. It is commonly accepted that memorization and recall are lower-order cognitive skills (LOCS) that require only a minimum level of understanding, whereas the application of knowledge and critical thinking are higher-order cognitive skills (HOCS) that require deep conceptual understanding (Zoller,1993) [13]. Students often have difficulty performing at these higher levels. In the past decade, considerable effort has been directed toward developing students' critical-thinking skills by increasing student engagement in the learning process (Handelsman *et al*., 2004) [14]. An essential component of this reform is the development of reliable tools that reinforce and assess these new teaching strategies.
- Multiple literacy refers to diverse sets of practices and semiotic systems to construct, acquire, communicate, and question knowledge as well to create, analyze, and transform relationships among people. By shifting the focus of the teaching and learning of literacy from an autonomous model to include a multiple literacies perspective, authentic spaces can be constructed for learning that prepare students for equitable participation in a global communication and information economy. The argument for a pedagogy that considers, not only traditional print and oral literacies, but also visual and multimodal representations, has been well established in the literature (Kress, 2003) [15]. A multiple literacies approach focuses not only on responding to printed texts, but also understanding how texts are constructed and what meaning is conveyed through multimodal representations.
- According to Lankshear (2003) [16], the New Literacy Studies (NLS) "refers to a new way of looking at literacy," one that takes a sociocultural approach to understanding and researching literacy (p. 23). A new literacy approach also focuses on "new forms of literacy" (p. 23). In many digital texts, different modalities, aural, visual, gestural, spatial and linguistic come together in one surround in ways that reshape the relationship between printed word and image or printed word and sound (Jewitt *et al*. 2005) [17]. This change in the materiality of text inevitably changes the way we read or receive the text and has important implications for the way we construct or write our own texts. Use of multiple literacies across the curriculum has a mean of 4.65 and SD of 0.19 in the present study and many educators felt that it would also lead to a perfect integration of curriculum across all grades. About 90% of the respondents have supported this view of introducing multiple literacies into the curriculum standards.
- Every student is unique, bringing a diversity of experiences, values, talents, attitudes, abilities, aspirations and needs and range of cultural and linguistic backgrounds. Teaching diversity is often considered a difficult task among educators. Student diversity in a classroom provides new opportunities for students to learn from and challenge one another, and potentially enriches both the classroom experience and more widely the breadth of the knowledge base within the higher educational institution (Jenny Shaw, 2009) [18]. Meaningful interactions and relationships among students, teachers, schools, and local communities can be fostered that hold all parties personally responsible for academic success (Conchas, 2006) [19]. Education institutions can structure positive learning environments that can connect teachers and students to each other with the common goal of fostering cooperation and academic excellence without resorting to cultural assimilation (Carter, 2005) [20].
- Science educators may demonstrate how differences are human variation instead of negative attributes. Enforcing these lessons allows children to appreciate multiculturalism and identify bias early on. If self-acceptance issues were dealt with at an early age in an open manner, then it would allow young people to build self - esteem. In addition to race and religion, educators should also discuss gender, size, and learning abilities. Let students realize how special they are and offer ways to overcome their vulnerabilities further allowing them to become confident. The educators in the present study expressed that if the students were exposed to this kind of education at a very early stage; it would benefit the students in terms of multi-dimensional thinking and will also help in reducing the class room behavioral issues. The curriculum in the early stages of education can be formed in such a way to address these issues. Literature

and social studies are great subjects to teach diversity because they deal with real life issues and people. Social Studies educators' can incorporate diversity through project-based assignments. Field trips to ethnic art and culture or any museums which show diversity in a positive approach may also be considered by the educators.

- Integrated curriculum has gained a great deal of acceptance among educators. Many educators provide testimonials about the effectiveness of units they teach, and many professional organizations stress integration across the curriculum. Educational researchers have found that an integrated curriculum can result in greater intellectual curiosity, improved attitude towards schooling, enhanced problem-solving skills, and higher achievement in college (Austin *et al*. 1997) [21] Barab (1997) [22] indicated that when students focus on problems worth solving, motivation and learning increase. Another premise supporting the move towards integrated curricula is that the current system of discipline-based education is not as effective as it must be. The assumption is that most real-world problems are multidisciplinary in nature and that the current curriculum is unable to engage students in real world situations. Thus, a discipline-based curriculum should be replaced with an integrated curriculum.
- Results from the study of Sheryl MacMath, *et al*. (2010) [23] illustrate that students experienced higher levels of motivation and academic success compared to work on previous units. The authors explore how higher levels of student self-efficacy were also recorded due to the repetition of content in different classrooms and across different contexts. The teacher responses from the present study also highlighted that students learn and assimilate knowledge better if learnt from variety of sources and different subject areas. They also expressed that social skills can also be taught through curriculum integration. Teachers familiar with curriculum and thematic integration may feel comfortable including skills and content from social and behavioral areas within their regular instructional units. Every curriculum must balance the content depth with the applications.
- A fundamental balance between the range of content and development of application of principles in daily life contexts. For example, present school curricula sometimes are confined with content that teachers are trained to teach which can result in superficial learning, not thorough understanding of core concepts and limited ability to transfer and apply knowledge to complex contexts.

8. Hypothesis testing

Value of test statstic

Table 3

Chi Square Calculated value	148.85
Degree of freedom (R-1)(C-1) (11-1)(4-1)	40
Chi Square Table value	55.758

Interpretation/ Decision rule

Here, Chi-Square calculated value >Chi-Square tabular value

$\Rightarrow$ Reject H_{01} at 5 percent level of significance.

Hence we can observe that there is a need for changes in present curriculum to suit 21st century skills.

9. Conclusion & Recommendations

- Classroom questioning should include open and closed questions, & questions at different levels of the cognitive hierarchy, i.e., a range running from lower-order questions (asking simply for factual recall) up to the higher order, such as evaluating and criticizing. The educators will have to develop creative thinking skills models and programs seeking to describe the essential elements of thinking and/or to develop a systematic approach to teaching thinking skills as part of the school curricula. It is important for teachers to explore different ways that children can participate in active learning. This can be done through active exploration and investigation. It challenges children's thinking and allows them to take more responsibility for their own learning.
- Learning through projects equipped with technology tools allows students to be intellectually challenged while providing them with a realistic snapshot of what the modern office looks like. Through projects, students acquire and refine their analysis and problem- solving skills as they work individually and in teams to find, process, and synthesize information they've found online. The online resources also provide each classroom with more interesting, diverse, and current learning materials. The Web connects students to experts in the real world and provides understanding through images, sound, and text.
- In a school, teachers in every subject area need to teach effective communication strategies. Although speech and communication classes are usually part of the middle school curriculum, students need constant reinforcement when it comes to communication skills. In addition to modeling effective communication, teachers can use a variety of activities integrated into daily class work to help students improve their communication skills. Incorporating Interpersonal Communications class as a part of the curriculum can be thought of. This will teach the students to manage relationships at home, in school.
- Questioning pattern in the test /assessments must be modified so as to incorporate free response questions highlighting the critical thinking processes. The assessment must be periodic and must contain all types of assessment styles which can bring out the inherent talent of every student. Also, the questions in every subject must be interlinked with other subjects so as to perfect application of knowledge into many areas of understanding.
- Promising equipment and ensuing globalization also offer boundless potential for thrilling innovative discoveries and expansion. School Curriculum should carry a vision to develop a culture where relation between student and teacher should be governed by learning process. The educators should motivate their students to actively engage in interactive sessions and innovative& critical thinking procedures.
- In the present scenario of Artificial intelligence gaining momentum, our math syllabus can be designed in such a way to incorporate coding techniques which can benefit the student learning in computer skills and applying them to solve real life problems. Introducing computer languages at an early age would boost the student critical thinking and can help them in multi-dimensional thinking.

- Education and curriculum of 21st century should be based on critical thinking and problem solving, quickness and adaptability should also be its basic instinct. Also, the boards of education, teachers should form a formidable curriculum such that the present-day industry demands are met. There are other skills that are important, which our education sys jhftem can give to students other than the knowledge-based system. Entrepreneurship is a skill which must be imparted to students along with emotional intelligence which is an important aspect to successful work and relationships. Education needs to tell about empowering students with dynamic as well transferable knowledge and skills that can hold to changing world and serve todays relevance.

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