

21st centuries skill implication on educational system

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Abstract. The purpose of this article is to identify skill needed in 21st centuries and its implication on Indonesia's educational system. This research found that the 21st centuries skill application has more measurable benefits in some sections of life, such as critical thinking and problem solving, initiative, creativity, and entrepreneurship, communication, teamwork, metacognition (change of mindset), digital literature. This study applied qualitative data analysis. The data were taken from different sources and literature. The analysis showed that The 21st centuries education concept's implementation can be applied in the curriculum of the required subject that is addressed to achieve learning and innovation skills competence and also technology and information media skills competence. While supporting subject group directed to achieve life and career skills competence. All subjects are the derivation from core subject 3R, which are reading, writing, and arithmetic. Based on the description above, it can be concluded that 21st centuries skill needs; (1) a life planning; (2) flexibility and adaptability; (3) initiative and self-management (4) entrepreneurship; (5) social and cultural interaction; (6) productivity and accountability; (7) leadership; (8) critical thinking, (9) problem solving; (10) communication; (11) collaboration and teamwork; (12) lifelong learning; and (13) digital literation.

1. Introduction

Technology in 21st centuries is growing rapidly in the development of business and industry. The technology's growth also leads the type and skills structure experienced differently years to years so that we cannot predict a skill for two decades ahead. In fulfilling the 21st century's skill needs, we cannot know whether the obstacles that the alumnus will be faced and what kind of job that the alumnus needed when they entered the workforce. Skill is very dependent on highly contextdependent and multifaceted [1]. Individual's creative mind all depends on working environment, knowledge and problem-solving skill. The questions arise about how will the teacher design his/her learning activities? What is the effective strategy that the teacher needs to apply to the class? How does the teacher prepare a skilled millennium generation?

Acceleration of educational improvement is supported by media and digital technology usage which is known as information superhighway [2]. Since the internet was introduced in the commercial world in early 1970, information rapidly distributed to the entire world. In this century, education becomes more important to ensure students to get a skill, innovation ability, creativity, teamwork, and learn how to use life skill in their life. Problems arise from the variety of importance and excellence skills for their future. 21st centuries skill concept is one that has gained increasing currency as a reflection both of changing workplace needs and the evolving role of education [1]. Because of the



need to gain access to fast information and fulfillment in 21st centuries, skill demands which are different from the past, making the knowledge-based education becomes important and needs a reformation in the education section. A good education is one that encouragingly makes a change by providing students with adequate knowledge and skills to face the future challenges.

2. 21st Century Skills in Education

The life of current students is very different with the pattern of life developed in the existing educational system. It shows lack of concerns towards knowledge and skills needed to understand existing perspective. Teachers, students, and authorities put forward a number of important skills for the student's future. The authorities prioritized employees' potential on the top list and they expected the importance of improving teacher's role in teaching based on the individual needs, especially subjects that emphasized on problem-solving skill. The implication of problem-solving skill in the learning process can be initiated earlier and become effective by practicing students with basic skills on practical application subjects. Emiliana Vegas [1] stated that a successful education system in school is one that attached problem-solving and combined the problem context with information, as for example, the use of mathematics and science to solve a practical problem.

This skill had to be known and owned by all employees in order to be skilled in the workforce. Harvey [3] viewed skill needs from individual and institutional perspective. Individual skills are skills or attribute of graduates to get a job. While institutional skill is related to the level of performance of educational institution's graduates. One-self attribute is a part of working characteristics, includes flexibility, adaptation ability, and problem-solving. Students demanded to: (1) have capacity and skill in analyzing and solving problems, to communicate idea and information, to do planning and organizing activities and collaboration with others; (2) have quality of confidence, hard works, optimism, a high self-esteem, and commitment using personal excellence; (3) have some related skills within their job and understanding of the work environment, choose a career and training; and (4) become confident, creative, and productive in using the new technology, primarily information and communication technologies, and to understand the effect from technology to society. Baruch [4] stated that individual has the responsibility for their own skill, while authorities provide a chance to develop them. It means every individual manage their careers based on the opportunity to their surroundings. Overtoom [5] stated that employee needs skills about self-management, teamwork, interpersonal ability, problem-based, and critical thinking in order to increase the productivity of their company.

Knowledge is an important asset for job seeker when they initiate their work, yet what is really sought is teamwork. Teamwork can be developed from an early age by enabling students to work in a team. Besides, communication is also an important aspect and is different for each person. An effective verbal communication is a fundamental tool of work. Currently, a verbal communication is not the only important aspect, but also writing skill, such as individual's ability in terms of writing sentences. Survey outcomes stated some of difference in college student's perspective on how this skill where almost half of the USA and Britain with range age from 18-25 years old show that their problem-solving skill is superior to Chinese college student [1] it may be a reflection on how this skill has or hasn't been a priority inside the education system in both countries.

Digital literacy is an important skill to help on codify information, problem-solving, and find meaning in word or data. Based on the study from The Economist Intelligence Unit (EIU), it stated that 21st centuries skills that fulfill the needs from authorities and wider society include leadership, digital literacy, problem-solving and communication complement the traditional skill, such as reading, writing, and counting [1]. Digital literacy is an ability to find, evaluate, utilize, share and make content using information technology. Every graduate assumed that they have already supplied with digital literacy because generally, the teacher had developed digital literacy to their students. Entrepreneurship is an important skill for students who will prepare them self in the workforce inside

future's network. Entrepreneurship and creativity skills have been provided by the teacher in school, but still in theoretical context and less of implementation. A low level of digital literacy, entrepreneurship, and creativity in employee indicate that those skills still rated as personal responsibility so that they are out of the curriculum.

Currently, educational systems unable to provide job opportunity and proper skill needs for students. The authorities stated that they are satisfied with young employees when they started working for the company. But, there is skills gap that hampers their organizational performance. The educational systems should provide a skill as their provision to enter the workforce. The teacher recognized that the business world and industrial world are unsatisfied with the existing educational standards. The educational system is considered incapable of wielding wider skills to the students and even there has been a decrease in emphasis on skill in the teacher's learning process. The lack of time allocation in the curriculum and the tightness of educational authorities that only implies reading and counting are also suspected to be the biggest obstacle for teachers to teach 21st-century skills.

Information and Communication Technology (ICT) innovations play a role in changing learning processes, but the educational system controls the progressive transformation. The change of ICT technology is one of the important drivers of evolving skills. But, what is the effect of technology changes that they have to teach a skill? Data states that many teachers claim that the advancement of ICT has changed the way they teach. The teacher can apply technology in creative ways. Teachers and other stakeholders acknowledge that there is still a gap in digital literacy between regions. Some students feel that the education system in their country has effectively used ICT, some students think that their school is very good at using technology for the learning process. The majority of teachers argue that their students have a better understanding of ICT's in the classroom which brings the consequences of change, although teachers don't need to add more value to the use of ICT. Business executives agree that expanding access to technology for schools and universities is one way that the educational system in their country can benefit business. The criticism of 21st-century skill fulfillment is education emphasizes too much on content. One of the challenges for education world is that skill and knowledge can be obtained easily through the internet.

3. Method of the Study

This study applied qualitative data analysis. The data were taken from different sources and literature. The data then were discussed and analyzed using objective point of view related to the needed skills in education.

4. Results and Discussion

How are future skills taught? According to Soulé, *"Education systems need to provide students with hands-on learning that mirrors real-world problems and work opportunities in an interdisciplinary way."* [6] The education system should provide a hands-on learning experience of the real world and employment opportunities in a variety of interdisciplinary ways to students. The 21st-century skills must be integrated into each subject, so the development of skills becomes integrated. Development of oral communication skills can be done by applying the use of dual-language; local language and international language, in the learning processes of all disciplines. It encourages students to gain public speaking experience, network developing, writing, and critical thinking. The key to skill development is the cross-curricular approach. According to Soulé, students with communication skill, collaboration, critical thinking, and problem-solving, and creativity and innovation related to their knowledge content will tend to be more successful, both at college, at work and as part of society [7]. The education system should provide a hands-on learning experience that reflects real-world problems and the opportunities for interdisciplinary work. This skill cannot be taught in a separate model but should instead lie along the curriculum. For students, they should be able to analyze information, manage resources, assess individual contributions to teams, and be responsible for specific tasks on all subjects. The implications for teachers are: (1) Teachers can develop this skill themselves and change

their pedagogical aspects, (2) Teachers need to improve skills to enable them to effectively teach content and skills, and (3) Teachers should teach students how to work effectively. While the implications for schools can be provided a free right in selecting, developing and applying 21st-century skills in their curriculum. The greatest obstacle to incorporate 21st-century skills more broadly in education precisely lies in the rigor of the existing curriculum. The teacher found that the curriculum was too rigid on the development of wider skills for sufficient time allocation. The concept of 21st-century education has been adopted by the Ministry of Education and Culture of the Republic of Indonesia to develop new curriculum for elementary school, junior high school, high school and vocational high school since 2009, among others is 21st Century Skills [8].

According to Trilling and Fadel [8], 21st-century skills are grouped into three types, namely (1) life and career skills, (2) learning and innovation skills, and (3) media skills and information skills. These three skills are summarized in a scheme called the 21st-century skills-knowledge rainbow (a twist of 21st-century skills knowledge). The scheme was adopted by the non-profit organization P21 that developed examples of 21st-century education work worldwide through the <http://www.p21.org/storage/images/stories/rainbow/Framework-copyrighted.png> website. The concept of 21st-century inventiveness and the 3R subject is described as follows.

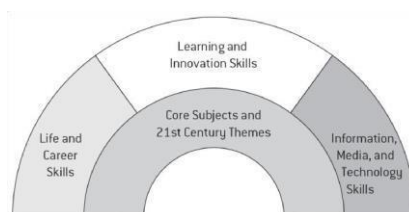


Figure 1. 21st-century knowledge-skills rainbow
(Source: Trilling dan Fadel (2009))

From arithmetic, the modern model of education develops with numbers. The term literacy and numeracy are considered capable of expressing the ability to produce something. The 3R concept is identical to the literacy, numeracy and ICT skills that develop in today's modern education system. In the context of 21st-century skills, 3R core subjects are defined as life and career skills, learning, and innovation skills and information media and technology skills.

Figure 2 shows a 21st-century life-skills sciences rainbow scheme adapted from P21. In the scheme developed by P21, it is confirmed by adding 3R core material in the educational context. 3R stands for reading, writing, and arithmetic. The idea of modern education comes from the syllables of reading and writing into literacy which is a model of learning in understanding ideas through the use of words.

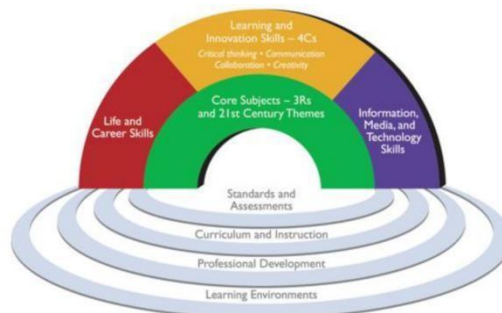


Figure 2. The rainbow of 21st-century knowledge adapted by P21
(Source: <http://www.p21.org/our-work/p21-framework>)

Life and career skills include: (a) having life planning, (b) flexibility and adaptability, (c) initiative and self-management, (d) entrepreneurship, (e) social and cultural interactions, f) productivity and accountability, and (g) leadership, and responsibility. Learning and innovation skills include (a) critical, creative, and innovative thinking, (b) problem solving, (c) communication, (d) collaborative and teamwork, and (e) lifelong learning. Technological and information media skills (L) include (a) information literacy, (b) media literacy and (c) information technology and communication literacy (Table 1).

Table 1. 21st Century Skill Needs

21 st -century skill	Description
Career and life skill	<ol style="list-style-type: none"> 1. Students have a plan: Students are able to set goals and targets to be achieved; defining specifications and quality standards; planning the use of resources including time, people, finances, and materials; understanding risk management; managing time and set priorities. 2. Flexibility and adaptability: Students can adapt to various changes and flexible in doing activities and learning process in the team. 3. Have initiative and self-management: Students can manage goals, target, time, media independently and manage themselves; have personal vision and goals; evaluate and monitor its own performance; have knowledge and beliefs of own ideas and vision; articulating their own ideas and vision; take responsibility; work ethically, work under pressure, target-oriented and test-resistant; taking initiative and making decisions, establishing evaluation criteria and participating in continuous improvement, reporting on progress and outcomes. 4. Entrepreneurship: Students are able to identify opportunities; assessing competitive advantage and ideas; identifying the customer or client needs; developing strategic objectives, dealing with stakeholders; using various methods of business communication as well as marketing and selling products or services. 5. Social and cultural interactions: Students can interact and work together effectively with different teams. 6. Productivity and accountability: Students can manage programs and activities oriented towards goals, targets, and outcomes. 7. Leadership and responsibility: Students can lead their friends and have responsibility for their duties, functions, and roles in their environment; managing a group of people, training, developing, motivating, providing feedback, monitoring, collecting, analyzing and organizing information, rational thinking, and managing and delegating tasks, coordination, and monitoring.

Innovation and Study Skill	<ol style="list-style-type: none"> 1. Critical, creative and innovative thinking: Students are able to use inductive or deductive approaches to identify facts and phenomena; systemic thinking; think and work creatively and create new innovations; have creativity, embark on innovative ideas and solutions; determine the commercial viability of ideas; translate ideas into action; have sensitivity to strategic issues, politics, commercial, environment, culture, etc.; 2. Problem solving: Students are able to analyze facts and test assumptions; to define problem and factor contribution; to develop creative, innovative and / or practical solutions; to show initiatives in identifying and solving problems; to solve problems independently and in teams; to implement various strategies for solving the problem of designing contingencies; to develop and evaluate options; to make realistic decisions and action plans; to use math including budgeting and financial management to solve problems; to solve customer problems in relation to complex issues; to evaluate and monitor the process and results and make decisions and solve problems. 3. Communication: students are able to communicate clearly, straightforwardly and in collaboration with other team members; listening, understanding and speaking clearly; write right and true; negotiate effectively; have empathy, firmness, and wisdom, understand the wishes of others; building relationships and networks; sharing information and ideas recently; fluent in Indonesian and other languages; as well as having logic in summarizing information or data. 4. . Collaborate and teamwork: Students are able to work effectively with people of all ages, gender, race, religion or political persuasion; identify the strength of team members; acknowledge its own strengths and limitations; understand the role of team members and perform tasks; able to lead, coaching, mentoring and motivating others; providing and receiving constructive feedback and resolving disagreements. 5. Life-long learning: Students are able to understand the learning needs for change; manage your own learning; sharing knowledge and experience in the workplace; contribute to the learning community in the workplace; using various media for learning - mentoring, peer support, networking, communication information technology applications (ICTs), applying learning technical issues; has an ongoing learning spirit; being willing to learn in any arrangement on and from work; be open to new ideas & techniques; ready to invest time & effort in learning new skills.
Digital Literacy Skill	<ol style="list-style-type: none"> 1. Literacy information: students are able to access information effectively (source information) and efficient (time); have a variety of basic ICT skills; using ICT to organize data; willing to learn new ICT skills; evaluate the information to be used critically and competently; use and manage information accurately and effectively to solve problems; 2. Media Literacy: students are able to select and develop media used to communicate; implement ICT as a management tool, and apply K3 in applying technology; 3. ICT literacy: students are able to analyze information media, and create appropriate media for communication.

5. Conclusion

Education in the 21st century is becoming increasingly important to ensure students have skills in learning and innovation, use of information technology and media, and can work and survive by utilizing life skills. As a first step, the implementation of 21st-century education concept can be applied to curriculum structure consisting of compulsory subjects aimed at achieving the competence of learning and innovation skills and technology and information media skills. While the supporting subject group is directed to achieve the competence of life and career skills. All subjects are a derivation of the 3R core subjects of reading, writing, and arithmetic. Based on the above description, it can be concluded that the needs of 21st century skills include (1) having life planning, (2) flexibility and adaptability, (3) initiative and self-management, (4) entrepreneurship, (5) social and cultural interaction, (6) productivity and accountability, (7) leadership, and responsibility, (8) critical thinking, creative and innovative, (9) problem solving, (10) communication, (11) collaborative and teamwork, (12) life and (13) digital literacy.

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