

## ENHANCING THE SKILLS OF PRE-SERVICE VOCATIONAL AND TECHNICAL EDUCATION TEACHERS FOR EFFECTIVE DELIVERY IN THE 21<sup>ST</sup> CENTURY

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**Abstract:** *The study adopted descriptive survey research design. The study was carried out in three higher institutions in Niger State, Nigeria offering VTE programmes. The population of the study was 146 lecturers in 122 VTE and 12 Educational Technology Lecturers. 96 VTE lecturers were sampled while entire 12 lecturers in Educational Technology were used for the study. The instrument was validated by three experts in the field of VTE and Educational Technology. The reliability coefficient for the entire 29 items questionnaire was determined to be 0.83. These results indicated that the instrument is reliable and it is therefore considered appropriate for use. Out of 108 copies of the questionnaire administered, 96 were returned representing 80.2% returned rate. Mean and Standard Deviation (SD) were used to answer the research questions. Decisions on the research questions were based on the resulting means score interpreted relative to the concept of real lower and upper limits of numbers on seven-point scales. The findings revealed the need to adopt instructional methods such as flipped classroom learning, project-based learning, competency-based learning and others in instructing pre-service teachers of VTE. revealed that for pre-service teachers to develop 21<sup>st</sup> century skill they must have ability to try to solve complex problems that have no single correct solution, work in pairs or small groups to complete a task together, convey their ideas using media other than a written paper and prepare and deliver oral presentations. It was recommended, among others, that Lecturers teaching pre-service teachers should ensure adequate usage of instructional methods that will facilitate the development of skills and practices that will enable them develop 21<sup>st</sup> century skills should be encouraged such as; try to solve complex problems that have no single correct solution, invent a solution to a complex problem.*

**Keywords:** *Preservice Teachers, Vocational & Technical Education, 21<sup>st</sup> Century Skills*

### Introduction

Education in general gives individual knowledge which empowers him with means to navigate the various facets of life. In this context education equips individuals with knowledge, skills and attitudes that enable him to come up with better decisions about life, hence it is acknowledged as a means for transforming and empowering communities (Kivunja, 2015). Education is central to development and to the improvement of the lives of people globally, and as such has been identified as a priority area in internationally agreed development goals, including the Millennium Development Goals and the World Programme of Action for Youth. Education is important in eradicating poverty and hunger and in promoting sustained, inclusive and equitable economic growth and sustainable development. Increased efforts towards education accessibility, quality and affordability are central to global development efforts.

Vocational and Technical Education (VTE) is usually defined as the type of education that emphasizes the application of skills, knowledge and attitudes required for employment in a particular occupation or cluster of related occupations in any field of social and economic activity (Uwaifo, 2009). VTE is a vehicle that in addition to providing practical education that makes graduates employable also equips them to set themselves up in business and become employers in the future. VTE provides students with “life skills” to become productive entrepreneurs as it engenders creative and innovative ideas, enlarges the economic pie, and increases personal freedom. Most of the expatriate engineers who are being paid millions of dollars to build Nigeria’s roads and bridges are graduates of technical and vocational colleges abroad. Moses, *et al.* (2017) noted that, the training in VTE enable the trainee to be skillful, self-reliant, enterprising and ready to create opportunities for business towards self and societal empowerment; because the flexibility and productivity of any workforce is critically dependent on availability of skilled workers especially technologists, technicians, craftsmen and artisans (Yoto & Bella, 2019).

Educational systems around the world are looking for best practices to prepare children and young people in schools today to cope with the life and work increasingly complex requirements of the 21st century. The life and work styles of the 21<sup>st</sup> century demand a certain skill set from students. It is the school's and the teachers' responsibility to prepare all children for the educational demands of life and work, in a rapidly changing world, by equipping them, the students, with the required skills. Because teachers are expected to empower the students with such skills, teacher preparation programs should offer multiple opportunities for teacher candidates to learn, develop and practice these skills, named life skills. Education plays four universal roles on society's evolving stage. It empowers us to contribute to work and society, exercise and develop our personal talents, fulfill our civic responsibilities, and carry our traditions and values forward. These are the four universal goals we expect the education of our children to achieve. Teacher education needs to provide teachers with opportunities to develop their own life skills and abilities to take these skills into their future classrooms (Voogt & Roblin, 2012).

Pre-service teachers need to be provided constant support for the development of their life skills to provide them with confidence to integrate the skills learnt into their teaching. These expectations make pre-service teachers' developing 21<sup>st</sup> century skills an important area of serious concern. Thus far, studies have mainly been cross-sectional for describing pre-service teachers' 21st-century skill and intervention studies for supporting the development of 21st-century skills with different courses and activities (Bedir, 2019; Valtonen *et al.*, 2017). All young people need access to quality education and learning that develops the skills, knowledge, attitudes and values that will enable them to navigate a complex world, and succeed in school, work and life. In low-income countries technical colleges has the potential to be a key platform for young people to enter the world of work, start a business, and have a positive impact in their communities; but only if they have the skills they need to break cycles of intergenerational poverty. To succeed within the current and future socio-economic environment, all young people must have access to quality education and learning that develops the skills, knowledge, attitudes and values they need to learn and relearn, to find and retain productive work, to make informed decisions, and to positively engage in their communities. The objective of 21<sup>st</sup> century skills are to prepare today's students to be decent citizens and responsible individuals who are aware of their abilities and potential.

In a classroom of the twenty-first century, instructors' change role from "expert" to "facilitator." The emphasis of training switches from merely "knowing" material to actually being able to use and apply it. Students who are being prepared for the 21st century will participate in continuous cycles of learning (Nakano & Wechsler, 2018). That result in a deeper comprehension of the subject area content and that help students build the vital skills needed to tackle future difficulties. The expectation of 21st-century skill development poses demands for teachers. 21st-century teachers must be competent in their learning and working skills; they need abilities and pedagogical practices that support their students' skill development. According to Kivunja (2015), teachers need to be able to integrate the training of 21st-century skills into pedagogical approaches. Again, this poses expectations for teacher education. Teacher training needs to provide new teachers with the competence to use pedagogical practices aligning with 21st-century skills. According to Hakkinen, *et al.*, (2017), teacher education can be a powerful channel to trigger longer-term change and support the integration of 21st-century skills within. The lack of appropriate knowledge and skills among the technical students and the shortfall of teachers' training on the requisite skills set to be imparted to the students' community have resulted in this deplorable state of unemployment. So, teachers are expected to be the facilitators of this life-long learner-centered classroom, which advocates competency-based approach, acquisition of skills, values and attitudes, participatory learning methods and new modes of assessment (Harishree & Mekala, 2020). Use of flipped classroom learning as flipped classroom is a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in students (Yildirim & Kiray, 2016; Arnold-Garza, 2014)

Flipping allows teachers to know their students better, makes your class transparent, is a great technique for absent teachers, changes classroom management, allows students to pause and rewind their teacher. increases student-teacher interaction, speaks the language of today's students. helps busy students, helps struggling students, helps students of all abilities to excel and allows students to pause and rewind their teacher (Chen, *et al.*, 2017). Meta-teaching helps prepare techno-pedagogically skilled teachers because it allows them to develop a holistic understanding of the process of teaching with technology. Project based learning teaches students not just content, but also important skills in ways students have to be able to function like adults in our society. These skills include communication and presentation skills, organization and time management skills, research and inquiry skills, self-assessment and reflection skills, group participation and leadership skills, and critical thinking. These skills include communication and presentation skills, organization and time management skills, research and inquiry skills, self-assessment and reflection skills, group participation and leadership skills, and critical thinking. Zuva and Zuva (2020) agreed that one of the strongest outcomes of the competency-based education system is that the learners feel more empowered as they have ownership over their education, they tend to be highly self-motivated as they seek mastery over their subject. Cooperative learning encourages active engagement by the students in learning, and it also builds critical skills needed in today's workplace. Online projects increase the audience and opportunity for cooperative learning by involving and communicating with a wide selection of people around the world. Students work directly with people from other places and cultures, and collaborate not only with peers, but with mentors and experts in a large number of fields.

### **Statement of the problem**

The study clearly showed that students graduating from secondary schools and technical colleges are sorely lacking in some basic skills and a large number of applied skills: such as; oral and written communications, critical thinking and problem solving, teamwork and collaboration, working in diverse teams and application of technology (Ranbir, 2018). Reports from around the world confirm that this “21st century skills gap” is costing business a great deal of money. Some estimate that well over \$200 billion a year is spent worldwide in finding and hiring scarce, highly skilled talent, and in bringing new employees up to required skill levels through costly training programmes (Bernie, & Charles, 2009). Furthermore, companies need highly competent employees ready to hit the ground running without extra training and development costs. Since it a fact that effectiveness of any education system depends greatly on the educational attainment of teachers because no system of education can be qualitatively higher than the quality and commitment of its teachers. The fact remains that teaching and learning depend on teacher for there cannot be any meaningful socio-economic and political development in any country without teachers (Tican & Deniz, 2019). Teachers play vital role in making the students perceive the subject knowledge as well as the knowledge pertaining to the context of real-life situations (Harishree & Mekala, 2020). So, the need for teachers to focus on life-long learning through the development of 21st Century skills has become indispensable.

### **Purpose of the study**

The study is to enhanced the 21<sup>st</sup> century skills of pre-service teachers of VTE for effective teaching and learning. Specifically, the study determined:

1. Instructional methods that will enhance 21<sup>st</sup> century skills of pre-service teachers of VTE.
2. The teaching practices that will support students' 21<sup>st</sup> century skills.

### **Research questions**

1. What are the instructional methods that will enhance 21<sup>st</sup> century skills of pre-service teachers of VTE?
2. What are the teaching practices that will support students' 21<sup>st</sup> century skills?

## Methodology

The study adopted descriptive survey research design. The study was carried out in three higher Institutions in Niger State, Nigeria offering VTE programmes. The population of the study was 146 lecturers in 122 VTE and 12 educational technology lecturers. 96 VTE lecturers were sampled while entire 12 lecturers in educational technology were used for the study. The instrument was validated by three experts and trial tested. Data generated was analysed using Cronbach's Alpha statistic to ascertain the internal consistency of the instrument and the extent of homogeneity of the items. The reliability coefficients obtained for all the sections were as follow; cluster A, 0.84 and Cluster B, 0.86. The reliability coefficient for the entire 29 items questionnaire was determined to be 0.83 which was considered appropriate for use. Out of 108 copies of the questionnaire administered, 96 were returned representing 80.2% returned rate. Mean and Standard Deviation (SD) were used to answer the research questions. Decisions on the research questions were based on the resulting means score interpreted relative to the concept of real lower and upper limits of numbers on seven scale as shown in Table 1. The standard deviation was used to decide on the closeness or otherwise of the respondents to the mean in their responses. Any item with standard deviation of less than 1.96 indicated that the respondents were not too far from the mean or from one another in their responses and any item having standard deviation equal or above stated value signified that respondents were too far from the mean.

**Table 1: Range of Values for the Scale Utilized**

S/N	Response	Point
1	Strongly Agreed	6.50-7.00
2	Agreed	5.50-6.49
3	Somewhat Agreed	4.50-5.49
4	Neither Agreed nor Disagreed	3.50-4.40
5	Somewhat Disagreed	2.50-3.49
6	Disagreed	1.50-2.49
7	Strongly Disagreed	0.50-1.49

**Table 2: Mean Responses of VTE and Educational Technology Lecturers on Instructional Methods that will Enhance 21<sup>st</sup> Century Skills of Pre-Service Teachers of VTE**

S/N	Item	Mean	SD	Remark
1	Flipped classroom learning	6.65	0.02	Strongly Agreed
2	Project-based learning	6.59	0.11	Strongly Agreed
3	Games simulation learning	5.67	0.19	Agreed
4	Cooperative learning	5.44	0.07	Somewhat Agreed
5	Gamification	5.57	0.54	Agreed
6	Problem-based Learning	5.87	0.23	Agreed
7	Design thinking learning	6.59	0.01	Strongly Agreed
8	Thinking-based learning	5.97	0.14	Agreed
9	Meta-Teaching and Process-Oriented Instruction	6.11	0.08	Agreed
10	Self-direct learning	6.07	0.11	Agreed
11	Competency-based learning	6.71	0.98	Strongly Agreed
12	Concept mapping	5.97	0.34	Agreed

The results of Table 2 revealed that the respondents strongly agreed with items 1, 2,3, 7 and 8 with means ranging from (6.59-6.71) and agreed with other items, expect item 4 which they somewhat agreed. The SD ranges from 0.01-0.98 which were less than 1.96 signifying that the respondent's responses were not far from each other.

**Table 3: Mean Responses of VTE and Educational Technology Lecturers on the Teaching Practices that will Support Students' 21<sup>st</sup> Century Skills**

S/N	Item	Mean	SD	RMK
1	Test out different ideas generated by them to improve them	6.09	0.00	A
2	Generate their own ideas to confront a problem or question	6.56	0.13	SA
3	Invent a solution to a complex, open-ended question or problem	5.98	0.87	A
4	Create an original product or performance to express their ideas	6.56	0.34	SA
5	Compare different information sources while completing a task	6.58	0.01	SA
6	Use idea creation skills such as brainstorming or concept mapping	6.61	0.05	SA
7	Draw their own conclusions based on analysis of numbers, facts, or relevant information	5.78	0.14	A
8	Develop arguments based on supporting evidence or reasoning	6.03	0.56	A
9	Solve complex problems that have no single correct solution	6.85	0.08	SA
10	Work in pairs or small groups to complete a task together	6.77	0.01	SA
11	Create joint products using contributions from each of them	6.45	0.17	A
12	Present their group work to the class	6.53	0.50	SA
13	Work as a team to incorporate feedback on group tasks or products	6.43	0.12	A
14	Structure data for use in written products or oral presentations	6.21	0.06	A
15	Convey their ideas using media other than a written paper	6.50	0.00	SA
16	Prepare and deliver an oral presentation to the teacher or others	6.69	0.11	SA
17	Answer questions in front of an audience	6.86	0.29	SA

Table 3. indicated that the respondents strongly agreed with 10 items and agreed with the remaining 7 items as a teaching practices that will support students' 21<sup>st</sup> century skills. The SD of all the items were below 1.96 meaning that their responses were closed to each other and that indicated reliability of the mean.

### Findings and discussion

1. The findings revealed the need to adopt instructional methods such as flipped classroom learning, project-based learning, competency-based learning and others in instructing pre-service teachers of VTE. If these methods are utilized the pre-service teachers are going to acquire 21<sup>st</sup> century skills and other skills that will help them gain employment, progress in employment and also ability to develop secondary education students 21<sup>st</sup> century skills when employed after graduation. Boss and Karaus (2007) identified the benefits project-based learning as follows. improving students' academic achievement; developing critical thinking skills, data and information processing, problem-solving, teamwork, communication and self-management; increasing students' motivation and interest; and giving learning experiences-based students' real life. PBL is generally done by groups of students working together toward a common goal PBL teaches students not just content, but also important skills in ways students have to be able to function like adults in the society. This real-world experience ensures that the students are better equipped to take on challenges and are job-ready (Anane, 2013). Self-directed learners go beyond mastery of skills and/or curriculum to explore and expand one's own learning and opportunities to gain expertise, they demonstrate initiative to advance skill levels towards a professional level. Demonstrate commitment to learning as a lifelong process. Reflect critically on past experiences in order to inform future progress (P21, 2009).

2. The study further revealed that for pre-service teachers to develop 21<sup>st</sup> century skill they must have ability to try to solve complex problems that have no single correct solution, work in pairs or small groups to complete a task together, convey their ideas using media other than a written paper and prepare and deliver an oral presentation to the teacher or others. This also in harmony with the study conducted by Abdelrahim, *et al.*, (2019) who observed that problem solving is often conceptualized as the use of critical thinking skills toward the effective resolution of a specific problem or toward a specific end goal. In communication and collaboration communication involves the ability to clearly articulate oneself through all media of communication oral, written, nonverbal, and digital as well as the skills necessary to be an active and respectful listener to diverse audiences, while collaboration includes similar dimensions as communication but also includes important individual contributions, such as flexibility willingness to participate, and recognition of group and individual efforts and success (Abdelrahim, *et al.*, 2019). Creativity and innovation involve applying a wide range of knowledge and skills to the generation of novel and worthwhile products as well as the ability to evaluate, elaborate, and refine ideas and products (Juliana, 2021).

## Conclusion

21st-century teachers must be competent in their learning and working skills; they need abilities and pedagogical practices that support their students' skill development. The results of the study indicated that some instructional methods and teaching practices need to be adopted in teaching pre-service teachers of VTE in order to develop 21<sup>st</sup> century skills. Since the teacher cannot give what he or she doesn't have and the effectiveness of any education system depends greatly on the educational attainment of teachers because no system of education can be qualitatively higher than the quality and commitment of its teachers.

## Recommendations

1. Lecturers teaching pre-service teachers should ensure adequate usage of instructional methods that will facilitate development 21<sup>st</sup> century skills, such as project-based learning, use of flipped classroom learning, Meta-Teaching and Process-Oriented Instruction and other instructional methods.
2. Teaching practices that will enable pre-service teachers of VTE to develop 21<sup>st</sup> century skills should be encouraged such as; try to solve complex problems that have no single correct solution, invent a solution to a complex, open-ended question or problem and others.

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