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Vocational Skills, Recognition of Prior Learning and Technology: The Future of Higher Education

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Abstract**—**The vocational education, enhanced by technology and Recognition of Prior Learning (RPL) is going to be the main ingredient of the future of education. This is coming from the various issues of the current educational system like cost, time, type of course, type of curriculum, unemployment, to name the major reasons. Most millennials like to perform and learn rather than learning how to perform. This is the essence of vocational education be it any field from cooking, painting, plumbing to modern technologies using computers. Even a more theoretical course like entrepreneurship can be taught as to be an entrepreneur and learn about its nuances. The best way to learn accountancy is actually keeping accounts for a small business or grocer and learn the ropes of accountancy and finance. The purpose of this study is to investigate the relationship between vocational skills, RPL and new technologies with future employability. This study implies that individual's knowledge and skills are essential aspects to be emphasized in future education and to give credit for prior experience for future employability. Virtual reality can be used to stimulate workplace situations for vocational learning for fields like hospitality, medical emergencies, healthcare, draughtsman ship, building inspection, quantity surveying, estimation, to name a few. All disruptions in future education, especially vocational education, are going to be technology driven with the advent of AI, ML, IoT, VR, VI etc. Vocational education not only helps institutes cut costs drastically, but allows all students to have hands-on experiences, rather than to be observers. The earlier experiential learning theory and the recent theory of knowledge and skills-based learning modified and applied to the vocational education and development of skills is the proposed contribution of this paper. Apart from secondary research study on major scholarly articles, books, primary research using interviews, questionnaire surveys have been used to validate and test the reliability of the suggested model using Partial Least Square- Structural Equation Method (PLS-SEM), the factors being assimilated using an existing literature review. Major findings have been that there exists high relationship between the vocational skills, RPL, new technology to the future employability through mediation of future employability skills.

Keywords**—**Vocational education, vocational skills, competencies, modern technologies, Recognition of Prior Learning, RPL.

I. Introduction

THIS research is based on extensive secondary research on major research journals and books majorly between 2016 to the end of 2021.

A. Vocational Skills and Its Importance

Vocational skills are career oriented and generally not academic inclined towards technical skills. Most millennial learners like to do or perform to learn and not just learn [32]. So, the vocational skills education has become popular and in economies have gained importance. Companies like Google are no longer looking at student credentials from universities but at skills displayed during tests and interview for recruitment [1]; [17].

Vocational education is focusing on life and need-based education that can convert unskilled, inexperienced and illiterate population into asset human resource [28]; [52]. Vocational education supports improvement to their standard of life and to help participation in national development. Many countries including Germany, UK, Australia have accrued economic benefits by enhancing Vocational Education (VE) [63]. So, it is seen that economic implications of VE are many, eradicating poverty, illiteracy and upgrading employability skills [42], [33].

B. RPL and Its Importance

RPL is used to give academic recognition for the formal learning to get recognized certification, informal learning from experience [18]. It also gives credit to non-formal learning for uncertificated but planned learning. It should be recognized that learning is a continuous process throughout lifetime and continuous professional development (CPD) activities in the workplace are of great importance combined with active training participation [18]. It is seen that learning also occurs in non-employment situations as at home or voluntary work [45]. The skills and knowledge can be acquired as an outcome of this learning and is comparable to learning gained from taught courses in colleges.

C. Modern Technologies and Their Importance to VE

Modern technologies like AI, ML, VR, data analytics etc. are transforming VE [16]. Artificial intelligence education focuses on the personalized learning of vocational students, achieving the higher value of vocational training, including creativity, curiosity, multidisciplinary thinking ability, creativity, critical thinking and problem-solving ability [13]. In addition, the event of AI education is going to support the analysis of students' advantages and drawbacks by analyzing personality characteristics, studying the behavioral habits. The teaching should consider learner aptitude, customized lessons and evaluating individualized characteristics [31]. AI can support humans to learn to be better at working together to solve problems through adaptive group formation, expert facilitation, virtual agents and intelligent moderation [47].

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Artificial intelligence will have a great impact on the training position and teaching mode of VE [53]. The educational environment continues to change rapidly due to the emerging technologies like Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (MR). The higher education sector is influenced by latest approach of using VR, AR & MR to teach & learn subjects like surgical science, biology, chemistry practical conducted in laboratories, engineering experiments, VE, etc., which is making learning more interesting & engaging. This allows the adoption of latest innovations in the education section through the adoption of VR, AR & MR solutions [21], [64].

The VR presents something which is not actually present with the help of computers. For experiencing VR, headsets are required to connect with a computer or gaming console. VR uses headset to give separation experience from real-world. This will go a long way in successful implementation of the same. This is due to the reality effect created by VR using tools like HTC Vive, Oculus Rift or Google Cardboard [39].

The AR utilizes the current environment and overlays with the digital information on it [40]. AR experience is gained by downloading AR apps on smartphones as the camera is enabled to replace real captured images with virtual objects automatically [64]. Examples are snapchatting lenses and the game Pokémon GO and the using tools like smartphones, AR apps [4].

MR is a combination of sensors, super-advanced optics and next generation computer power. User gets to experience of viewing 3D objects which replaces the MR holographic images from the ground reality and view it from different angles [64]. MR uses the best of both VR and AR so the interaction is similar to both of them [23].

D. Business Transformation Model

It can be applied to the transformation of VE and training using RPL and new technologies. This requires acceptance and change of mindset of the new changes in the VE system for the improvement. The resistance from the participants and stakeholders can be removed by spreading awareness, convincing the participants of the benefits to change [55], [57].

Scope of Research

This study is only on secondary research by referring to prior knowledge in this domain of VE, RPL and new technologies to be main stay of future education. The gaps in the knowledge have been identified by the secondary research and have been the contribution of this research study. Primary research will be done in the future and part of the suggested research work. The article proposes to discuss the improvements that the VE can make to the employment situation as the current academic system is failing to make a major contribution and seem to have major issues.

Research Problems

a. Can the vocational skills enhance employability and employment opportunities?
b. How can RPL be used to enhance certification and customized course enrollment processes?
c. Are the new technologies transforming education for betterment?

Research Objectives

a. The VE should be aligned to the industrial needs so that the employment skills and competencies are imparted to the learners.
b. RPL can be basis of making customized curriculum for vocational learning for future employment
c. Emerging technologies must be used to customize for student learning, teaching and providing the environment for learning.

II. Literature Survey

The literature survey will help in identifying the dependent and independent variable to form the conceptual model and then the gaps identified to formulate the research framework [49]. Confirmation is got on the gaps and the usage to the VE, future implementation to selected area. Deterministic Secondary Research from various references as shown in the paper helps identify the gaps in the VE & RPL topics. Correlation analysis can be used to see how the dependent variable is actually dependent on the independent variable. It is of interest in this research to ascertain the relationship of the independent variables identified and to analyze the influence on the adaption of the new technology for VE [49].

The study will help in forming the research problems and research areas as suggested by other researchers as gaps. Then the research objectives are formulated to direct the research to get to the solution. This is portrayed in research framework given in Fig. 1. The "Usefulness of Vocational skills, RPL and Technology on the Future Education" and the manner by which these vocational skills can be imparted by appropriate training, giving credit for RPL gained by experience and technology used, are the main components of the study [48]. This is shown as the independent variables and the factors which can influence the dependent variable [12]. This leads to the research problems, research objectives and the solutions, along with the findings, analysis and implementation. Relevant theories like the experiential learning theory and theory of knowledge and skills-based learning are applicable and so be critiqued in [7].

Theory of Knowledge and Skills-Based Learning

The theory reinstates the importance of knowledge along with the skills to apply this gained knowledge however it is not clear about the further learning like reflection as the experiential learning does. Moreover, none of these theories advocate the use of technology to gain these skills and to upgrade using technology, also learning technology which is the need of the hour [57].

Most companies in current times like Google, Microsoft and Amazon are using these on-the-job training, evaluation, reflection to upgrade skills of the employees and for education, training purposes. The earlier form of learning stand disrupted so it is important to develop new models for future education and employability.

III. Research Framework

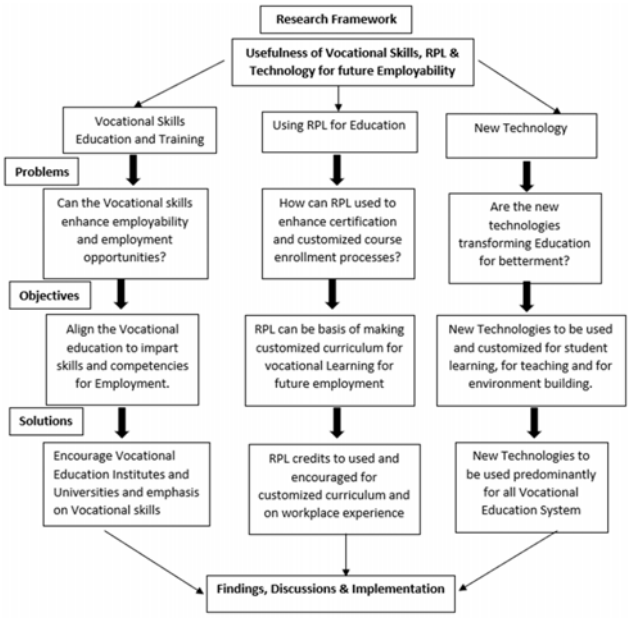
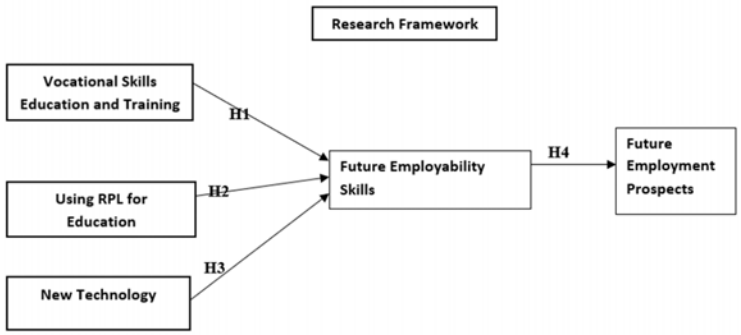


Fig. 1 Research Framework

IV. Research Methodology

This research is of exploratory nature, certain things are known on the topic about the usefulness of the vocational skills, RPL and technology for future education [11]. Information and opinions have been consolidated by academic literature review focusing on the last four years of peer-reviewed publications and desk research and media narrative analysis across the education sector, including policy research and teacher surveys. It can lead to the improvement in the current situation of unemployment, underemployment and mismatch between skills demanded by industry and available, imparted skills to the learners. It is clear that more research is needed to prove this point, it is at infant stage or suggested idea. This forms a basis for further causal research to prove the outcomes [56]. The further part of the research which is not in scope of this paper is the conducting of primary research in terms of qualitative research and followed by quantitative research. Expert opinion is the part of the qualitative methodology where opinion is sort in vocational, RPL and technology application areas to formulate the survey questionnaire to be conducted as part of the quantitative research. Focus group or interview of 12 experts can be recorded and transcripted and then subsequently the questionnaire can be developed for getting the opinion from 385 sample size through digital means [27]. The structural model can be tested using Adanco Software to develop the correlation between the dependent and independent variables. This is suggested for further research and to be published later.



- H1: The vocational skills education and trainings have very significant relationship to future employability.
- H2: The use of RPL has a very significant relationship to future employability.
- H3: The new technology has very significant relationship to the future employability.
- H4: The future employability skills are mediated between vocational skills, RPL and new technology and showed a very significant relationship to future employability.

Fig. 2 (a) Conceptual Framework

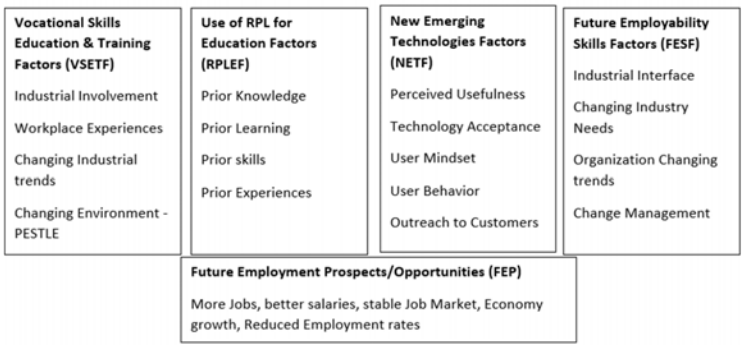


Fig. 2 (b) Sub-variables identified for each independent variable

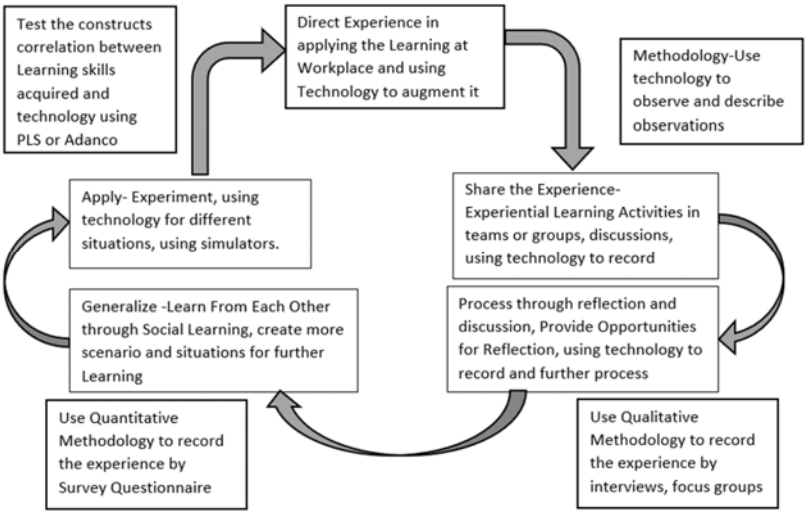


Fig. 3 Research Cycle

Questionnaire Development

The questionnaire has been developed to gather data by speaking, discussing and interviewing experts from the education field, industry experts (they have been called as interviewees) and some of the extracts has been put below. Most of the interviewees confirmed that the major factors can be categorized as

a. Vocational skills education & training
b. Use of RPL for education
c. New emerging technologies
d. Future employability skills

which are leading to future employment prospects/ opportunities. Now for identifying the factors that determine these above important features of education a consensus was taken by discussing with the interviewees using structured questions, free discussions, which was transcripted to get the final shape. The summary was then made to formulate the hypotheses followed by the questionnaire circulation to a target population of 1000 of important stakeholders involving teachers, students, educationists, academicians, experts, government regulators in UAE, India, Australia, Singapore, Malaysia. The demographic profile has been collected and shown in Table I for reference. The virtual interviews were conducted with two interviewees each from Australia, UAE, Malaysia and three interviewees each from Singapore and India. 12 expert interviews with global and country-specific thought leaders in education have been used to get consensus for the hypotheses and the factors.

Interviews conducted were transcripted and the interview extracts have been consolidated to represent the majority view.

Interview Extracts

Interviewee 1 (Australia): "The bane of current education system has been the lack of employment opportunities for the educated youth which has led to a societal risk with unemployment rates being unmanageable."

Interviewee 3 (Malaysia): "Poverty stricken economies are dependent on the education, quality of the education to ensure the learners get employed in the near future and this has been elusive in the last two decades. I think the main way forward is to impart skills which will get the learners guaranteed jobs and the only way is to involve the industries in a big way".

Interviewee 9 (India): "The main urgency is to revamp the whole educational system to make it vocational and skill based from the school to the university which has been recommended to the government as new education policy with emphasis on research".

Interviewee 10 (UAE): "The technology-based education is a must and the whole system should accept the new emerging technologies to change the way it is taught, studied, imparting knowledge and skills to achieve end outcome of securing jobs for the learners, especially the UAE Nationals."

Interviewee 4 (Singapore) and 6 (India): "The recognition of earlier knowledge, skills, experienced need to be acknowledged so the education is specific and not boring for the learners who are already working or professional. this will also take care of the learners who are forced to take a break in between studies."

Interviewee 3 (Malaysia) and 7 (UAE): "It is of prime importance to involve the corporate, the industries when education curriculum is developed so that what skills that are required is delivered to the learners, this will enable better employment chances. It is already noticed that certain Industries have developed their own academy to deliver these skills like Emirates Airlines, ADNOC (Abu Dhabi National and Oil Company), EGA (Emirates Global Aluminum), and Google lately. This can enhance the workplace experiences, and adapt to the changing trends, environment in accelerated manner."

Interviewee 2 (India), 3 (Malaysia), 5 (Singapore) and 8 (Australia): "New emerging technologies are making education disruptions, changing the role of most stakeholders, bringing in volumes due to enhanced ability to reach learners, facilitate the learners with their own method of learning. The current generation of learners have got exciting options and technology usage like AI, VR, AR, Blockchain which is revolution education. Most important is to find whether these available technologies will be adapted, as the usefulness, stakeholder

behavior and mindset will determine its usage over time.

Interviewee 2 (India), 10 (UAE), 11 (Malaysia) and 12 (Singapore): "I think the best way forward for education and for the learner employability is to increase industrial interface as this will take of the changing industry needs, the organization changing trends and the changing management norms. This will reduce the risk of unemployment and the betterment of society, meeting the skills actually needed in the industry.

Interviewee 3 (Malaysia), 6 (India), 7 (UAE), 9 (India): **"**Most global economies are investing in education sector for the future of the coming generation to be employable and get better opportunities in the challenging, competitive tomorrow. Globally, 92% of future jobs will need digital skills and 45% of jobs will require workers who can configure and work confidently with digital systems and technology. The quality, the agility and the technology revolution will ensure the future prospects of education and job opportunities."

All these extracts helped in getting a consensus on the factors and in designing the questionnaire and pilot study conducted with 30 respondents giving their feedback for improvement.

V. Findings, Analysis and Implementation

PLS with SEM helps examine the relationships that exist among variables of interest. The fact that unobservable, hard-to-measure latent variables can be used in SEM makes it ideal for tackling business research problems [58]. The PLS method is useful for this research paper as the education applications have little available theory, predictive accuracy is of paramount importance and correct model specification cannot be ensured. The sampling done and the availability of respondents might not ensure normal distribution and PLS-SEM can take care of this limitation [25].

A. Primary Survey Data

1. Demographic Profile

TABLE I
Demographic Profile

Demographic Variable	Category	%	Numbers	The Field of work of the Respondent	%
Age Group	18-25	19.4	75	Education	39.3
	26-35	27.8	107	IT/Technology	26.8
	36-45	26.8	103	Logistics/Transportation	10.6
	46-55	14.3	55	Hospitality and Tourism	5.2
	56+	11.7	45	Medical Field	5.8
Gender	Male	56.6	218	Sports	3.7
	Female	43.4	167	Jewelry and Fashion design	3.4
				Construction and Engineering	3.6
				others	1.6

Demographic Variable	Category	%	Demographic Variable	Category	%
Education	Highschool	2.1	Income Level per Month	Under 5000 AED	31.4
	Undergraduate	6.5		5001-10000 AED	14.1
	Graduate	36.7		10001-15000 AED	17.3
	Masters	37.1		15001-20000 AED	10.5
	Doctoral	17.6		Above 20001	26.7

2. Overall Model

All path coefficients have *** indicating all of them are significant and consistent to the SEM. Overall R^2 of 0.667 means that 66.7% of the relations and correlations between the constructs have been explained satisfactorily which is considered good statistically (R^2 >2.5) [8].

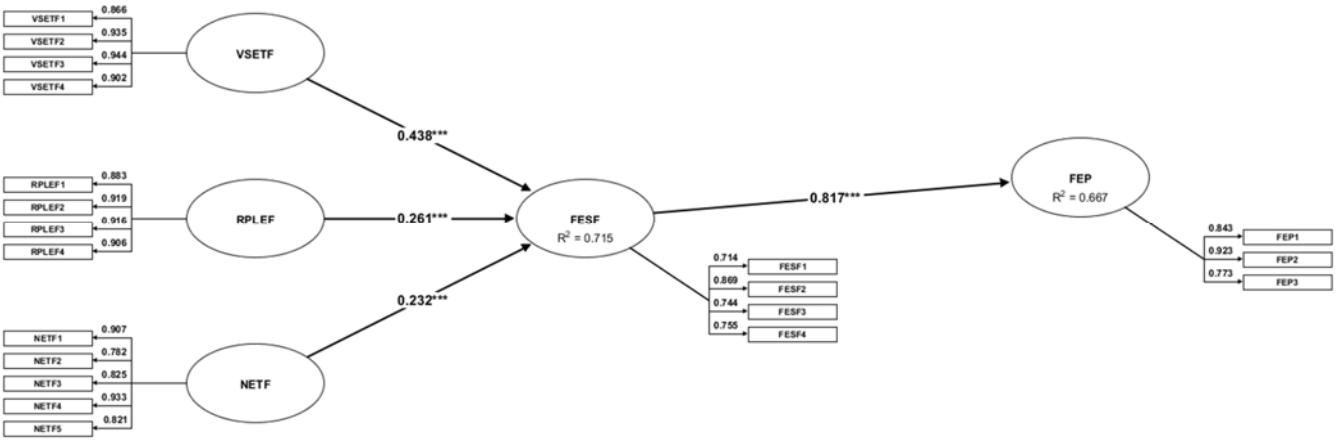


Fig. 4 SEM Overall Model Adanco Output

3. Reflective Measurement Model

The reflective measurement is the first stage of the evaluation in examining the reliability and validity of the measurement model [8]. The reason for only using reflective measurement in this research was because all the latent variables in this research were from the construct to the indicators, which were endogenous latent variables. Therefore, this section will be examining the following important indicators: (1) indicator reliability (loadings), (2) construct reliability, (3) convergent validity and, (4) discriminant validity.

a. Indicator Reliability

If the loading score is above 0.7 then the construct explains more than 50% the variable. In Table II, it is seen that all the indicators' scores are above 0.7 [8].

TABLE II
INDICATOR RELIABILITY

Indicator	VSETF	RPLEF	NETF	FESF	FEP
VSETF1	0.7501				
VSETF2	0.8747				
VSETF3	0.8909				
VSETF4	0.8137				
RPLEF1		0.7801			
RPLEF2		0.8453			
RPLEF3		0.8391			
RPLEF4		0.8206			
NETF1			0.8222		
NETF2			0.7119		
NETF3			0.7803		
NETF4			0.8702		
NETF5			0.7740		
FESF1				0.7105	
FESF2				0.7547	
FESF3				0.7539	
FESF4				0.7702	
FEP1					0.7111
FEP2					0.8520
FEP3					0.7978

b. Internal Consistency Reliability

The next step is to examine the internal consistency reliability for the reflective measurement model, where previous studies stated that the higher the value indicator, the higher the degree of reliability [25]. In addition, J€oreskog's rho (p_c) was the common method used to evaluate the internal consistency reliability. The minimum acceptable value for internal consistency reliability was 0.6, while the maximum value was 0.95. Based on Table III, the result showed that the J€oreskog's rho (p_c) values for each.

TABLE III
INTERNAL CONSISTENCY RELIABILITY

Construct	Jöreskog's rho (ρ_c)	Cronbach's alpha(α)
VSETF	0.9520	0.9324
RPLEF	0.9484	0.9274
NETF	0.9314	0.9070
FESF	0.8551	0.7733
FEP	0.8849	0.8034

c. Convergent Validity

According to researchers [25], convergent validity is used to measure and examine the extent that a construct converges with the specific construct's indicators by explaining the items' variance. Commonly, the average variance extracted (AVE) will be used to measure for all items associated with each construct. The mean of the squared loadings for all indicators associated with the construct is the calculation method to calculate the value of AVE. In addition, the minimum acceptable value for AVE is 0.5, and if the value is more than 0.5, the result represented that the construct explains more than 50 percent of the variance of items [8]. Based on the result from Table IV, all the AVE values for the constructs in this research were exceeding 0.5.

TABLE IV
CONVERGENT VALIDITY

Construct	Average variance extracted (AVE)
VSETF	0.8324
RPLEF	0.8213
NETF	0.7317
FESF	0.7973
FEP	0.7203

d. Discriminant Validity

Discriminant validity was the final step in the reflective measurement model after the indicator reliability, internal consistency reliability, and convergent validity were successfully established. According to [8], discriminant validity methods used to measure the different constructs differ from one another, in terms of how much a variable correlates with other variables and how much the indicators represent only a single variable [8].

TABLE V
DISCRIMINANT VALIDITY

Construct	VSETF	RPLEF	NETF	FESF	FEP
VSETF	0.8324				
RPLEF	0.5671	0.8213			
NETF	0.4412	0.5964	0.7317		
FESF	0.4228	0.5937	0.5253	0.6973	
FEP	0.3870	0.5787	0.5587	0.6671	0.7203

Squared correlations; AVE in the diagonal

B. Structural Model Assessment

Before the structural model assessment, the potential collinearity between the predictor constructs must be tested to ensure the quality of the results. Therefore, this section will be divided into several subtopics: (1) collinearity, (2) predictive relevance and, (3) significance and relevance of path coefficients.

1. Collinearity

In order to ensure that the results were not biased by collinearity issues, variance inflation factor (VIF) was used to measure for each indicator in the construction. Usually, the value of VIF less than 5 is acceptable and assumed to be safe for avoiding any collinearity issues, but there could be exceptions [6]. Based on the results from Table VI, all the indicators' VIF values were below five except for improved effectiveness under perceived usefulness, which was 5.11, which is acceptable. This result represented that there were no significant collinearity issues observed in this model.

2. Predictive Relevance (R2)

After having confirmed of no collinearity issues in this research, coefficient of determination (R2) was used to measure how well the construct was explained toward all the constructs in the research. According to [8], the minimum requirement of R2 was 0.25, and the construct was relevant and significant if the value of R2 exceeded 0.25. Based on the result from Table VII, the value of R2 was 0.667, which represented that the construct was relevant and significant, but considered as moderately low in explaining all the variables in the research [25], [8].

TABLE VI
INDICATOR MULTICOLLINEARITY

Indicator	VSETF	RPLEF	NETF	FESF	FEP
VSETF1	3.7513				
VSETF2	4.6695				
VSETF3	4.8044				
VSETF4	4.0804				
RPLEF1		3.9738			
RPLEF2		4.7251			
RPLEF3		4.8270			
RPLEF4		4.5595			
NETF1			3.6246		
NETF2			1.8996		
NETF3			3.2161		
NETF4			4.2393		
NETF5			2.4857		
FESF1				1.9762	
FESF2				2.4461	
FESF3				1.7632	
FESF4				1.9013	
FEP1					2.0160
FEP2					2.5913
FEP3					1.5613

C. Significance and Relevance of Path Coefficients

The final step in the structural model assessment was significance and relevance of path coefficients. According to [8], the standard range for path coefficient values was from -1 to 1 one, while the value closer to 1 represented strong positive relationship, and the value closer to -1 represented strong negative relationship. The results from the bootstrapping procedure (385 cases, 1000 samples, no sign changes option) reveal that four of three structural relationships were significant ($p \leq 0.05$). Based on the standard bootstrap results in Table VIII, the results showed that the p-value (two-sided) of all factors was 0.0000, which represented that the relationships were highly significant.

TABLE VII
COEFFICIENT DETERMINATION

Construct	Coefficient of determination (R^2)	Adjusted R^2
FESF	0.7153	0.7103
FEP	0.6671	0.6651

TABLE VIII
BOOTSTRAP DIRECT EFFECTS INFERENCE

Effect	Standard bootstrap results p-value (2- sided)
VSETF -> FESF	0.0000
RPLEF -> FESF	0.0000
NETF -> FESF	0.0000
FESF -> FEP	0.0000

TABLE IX
PATH COEFFICIENT

Independent variable	Dependent variable	
	FESF	FEP
VSETF	0.4384	
RPLEF	0.2614	
NETF	0.2317	
FESF		0.8167

TABLE X
DIRECT EFFECTS INTERFERENCE

Effect	Original coefficient	Standard bootstrap results					Percentile bootstrap quantiles				Supported/ Not Supported
		Mean value	Standard error	t-value	p-value (2-sided)	p-value (1-sided)	0.5%	2.5%	97.5%	99.5%	
H1-VSETF -> FESF	0.4384	0.4321	0.0565	7.7617	0.0000	0.0000	0.2378	0.2960	0.5197	0.5410	Supported
H2-RPLEF -> FESF	0.2614	0.2597	0.0423	6.1812	0.0000	0.0000	0.1451	0.1736	0.3396	0.3644	Supported
H3-NETF -> FESF	0.2317	0.2423	0.0391	5.9230	0.0000	0.0000	0.1530	0.1734	0.3261	0.3740	Supported
H4-FESF -> FEP	0.8167	0.8166	0.0296	27.5652	0.0000	0.0000	0.7288	0.7555	0.8715	0.8863	Supported

Significance of the Relationship for Each Hypothesis:

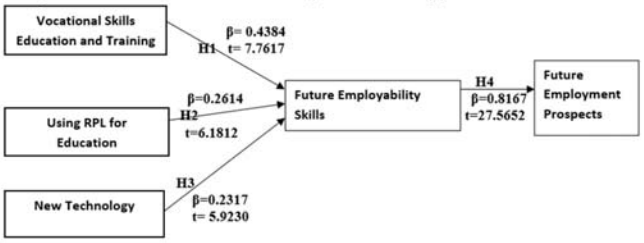


Fig. 5 Hypotheses relationship diagram

Based on the Research Final Model (Fig. 4), the model is tested and validated as per the parameters shown in Tables I-X. The hypotheses 1-4 have been proven to be significantly valid and acceptable. The p-values (far below 0.01 for each relationship) and the t-values (well over 5.0 for each relationship) support the hypotheses formulated and the relationship between them. It also proves that the relationships are very significant as shown by the high values of p and t in Table X. So, we accept the hypotheses, and the results will prove that the VE, RPL, and technology lead to better employment prospects. H1, H2, H3, H4 hypotheses have been accepted as the model path coefficients and the R^2 is above the acceptable value, which calculated to be 0.667.

C. Vocational Skills and Competencies Enhancement for Future Education

Vocational skills are varied and to enlist them will be a massive task. So, the research study is narrowed to few sample cases to give a prospective about how they are crucial for employment prospective of the learners [61]. Entrepreneurship is taught as course in most universities, the entrepreneur skills are studied and the strategies used by leaders and the functions of the managers are studied. If it has to be truly vocational then the learner can be encouraged to start a project and make a proposal to submit for licenses, finance and made into a startup. The faculty role is to guide the learners on the identifying the

business interests, passion of the learner and help them in starting, establishing this business [31]. If for example, learner is interested in cars and would like to start business around cars. Car rentals would be good business preposition. So, business proposal for car rentals is prepared as a project, doing the financial feasibility, business strategies are made, competition analysis is done. So, all the subjects and topics are covered as a do it lesson. Then the bank proposal is made and applied for loan. Once the loan is sanctioned the learner can start the business going for the licensing and other business tasks like looking for the right people. A lot of students enjoy this style and method of learning, by doing and the outcome is the business itself along with the certification done [19]. The society benefits as the learner is self-employed and will be able to employ more people. All the stakeholders also benefit and the learner has his own business. This way all the courses can be structured as activities which the learners perform and learn. This is the true essence of being vocational [26]. The same can be extended to cooking, plumbing, art work, computer repairing, new technologies like AI, ML, VR etc. are learned as startup units [21].

Skills development model can improve the existing education system and offer an alternative method outside of the traditional system. This is done to improve their quality, relevance, and sustainability supported by harnessing new technology [48]. The human element is also worked on to reduce the resistance and take every participant consensus [22].

D. RPL to Be Useful in Enhancement of Customized Courses for Future Education

The core idea of RPL is to market, to form visible and to form full use of the whole scope of learning results and (work) experience gained by a private over the lifespan and regardless of where, when and the way the training happened [6]. Regulatory bodies, adult learning centers, career development practitioners, employers, training institutions, colleges and universities across the globe use RPL, prior learning assessment (PLA), or prior learning assessment and recognition (PLAR) to gauge skills and knowledge acquired outside the classroom for the aim of recognizing competence against a given set of standards, competencies, or learning outcomes [3].

Experiential Learning Model supports learners to engage in stimulating activities that give hands on experience of reality. The experiential activities enable the students to connect what they are learning to prior knowledge and apply it to new situations or problems [5]. Experiential Learning Theory can be applied to vocational training and development successfully by making some modifications by augmenting with technologies. The Experiential Learning Theory uses the cycle illustrated in Fig. 3 and the Research Methodology proposed [50]; [15].

E. New Technologies Supporting the Future Vocational Education

VE helps people in enhanced performance on jobs as they acquire a great learning experience. Working professionals hone their skills and learn on the job as part-time students. Technology is profoundly changing education [10]. Technology has enabled reach to learners across the globe and expanded access to education. Earlier, about 40 years back, library books were available to elite and few people had access to education. Students travelled to centers of learning for education. Modern times, plethora data (books, audio, images, videos) are available at the press of the mouse through the web, and opportunities for formal learning are available online worldwide through learning systems like MOOCs, wenairs, podcasts, traditional online degree programs, and more. Technology has given access to learners globally and augmented exposure to knowledge base [7], [65]. Communication and collaboration opportunities have also been opened by technology. Traditional classrooms are relatively isolated, and collaboration has been limited to other students within an equivalent classroom or building [65]. Today, technology enables sorts of communication and collaboration undreamed within the past. Students during a classroom within the rural U.S., for instance, can study the arctic by following the expedition of a team of scientists within the region, read scientists' blog posting, view photos, e-mail inquiries to the scientists, and even talk accept the scientists via a videoconference. Students can share what they are learning with students in other classrooms in other states who are tracking an equivalent expedition. Students can collaborate on group projects using technology-based tools like wikis and Google docs [38]. The walls of the school rooms are not any longer a barrier as technology enables new ways of learning, communicating, and dealing collaboratively. Educational technology encompasses e-learning, instructional technology, information and communication technology (ICT) in education, EdTech, learning technology, multimedia learning, technology-enhanced learning (TEL), computer-based instruction (CBI), computer-managed instruction, computer-based training (CBT) [9]. Here are a number of the most benefits of using technology within the VE classroom [35]. It improves engagement between the participants and the teacher, improves knowledge retention, encourages individual learning at one's convenience in time and place, encourages collaboration, improved quality. Students learn useful life skills through technology, and it benefits the teachers to teach online [62]. Technology may be a powerful tool which will support and transform education in some ways, from making it easier for teachers to make instructional materials to enabling new ways for people to find out and work together. With the worldwide reach of the web and therefore the ubiquity of smart devices which will hook up with it, a replacement age of anytime anywhere education is dawning. It will be up to instructional designers and academic technologies to form the foremost of the opportunities provided by technology to vary education so as effective and efficient education is available to everyone everywhere [44]. Technology has also begun to vary the roles of teachers and learners. Technology has also begun to vary the roles of teachers and learners. Schools and universities across the country are starting to redesign learning spaces to enable this new model of education, foster more interaction and tiny group work, and use technology as an education enabler [29], [51].

Technology adaptation model in education marks the

emergence of virtual education and has paved the way for the diffusion of e-learning [38]. Understanding key determinants for successful virtual education will provide important theoretical and practical implications for developing e-education strategies [59]. So, the technology acceptance model also is relevant to distance, online education. All stakeholders should participate in establishing this model for transformation from traditional education to student-centric education model.

The suggested model or research framework is combination of the vocational skills gained due to knowledge, training or work and work experience, the feel of doing certain jobs (like flying instead of stimulators). The need to recognize these workplace skills & learnings are the way for future education and employability. The research analysis has tested and validated the research framework suggested. The findings are different to the various theories used till date and it has been tested to be reliable and validated as per consensus of education experts, teachers, consultants, learners, employees, employers and worth considering for researching future models [43].

VI. Discussion and Implications to the Current Theories of Findings

Experiential learning theory has four phases of concrete learning, reflective observation, abstract conceptualization and active experimentation which is old theory. It does not involve the technology as one of the main components in learning and experiencing. Technology can be used in learning which is an important component and quite evident in social distancing and also for repeated learning like video recording. The theory of knowledge and skills-based learning involves both the knowledge that the student already has, and the understanding that they are going to achieve by doing work which lacks the technology and the user intention to use [37]. Technology adaptation model in education is about using technology like virtual learning, e-learning and the user mindset and intention to use. The transformation model suggests change from traditional learning system which was organization centric, university centric to quality-based student-centric system [29]. So, it is noticed that none of the theories like the TAM, Experimental Theory nor the Business Transformation Model on their own reflect the current needs of the education or completely cater to the current need of the learner nor reflect the way forward for future education [36].

Most of the research studies have been sector specific and sometimes region specific, the current study has made inroads to look at different stakeholders and across India, UAE, Singapore, Australia and Malaysia. So, the study has its unique features and contribution to the current theory and literature available.

The suggested model in this paper attempts to consider all the factors, needs of the current and future education stemming from the unsuitability of these theories for the future education model. The model has considered the industrial needs to enhance learner vocational skills and knowledge and to give credit for their experience and learning also achieved in the past (RPL). This suggested model has been validated and tested for reliability after the consensus of 385 respondents have been collected and analyzed [20]. The industry expects that the education imparted to the learners should be competence based [54]. This improves the employability prospects significantly due to the imparted employability skills and the learner satisfaction of landing good jobs goes a long way to improve the societal and economic condition [24]. Another relevant theory is the Project-Based Competencies which advocates team work skills apart from project skills like time management, problem identification, problem solving, technology usage skills like Microsoft Project, presentation and reporting skills, and budgeting skills [34]. These are the findings of this research which builds on the earlier research and theories mentioned above.

Vocational skills scope has increased due to the use of technology and the technology helps achieve more skills by training and development [14]. So, this has been missing in the earlier theories. However, the earlier literature had helped in building this model, which has been tested for reliability and validated using Adanco. Future research can learn from these findings and add further by looking at the continuous improvement envisaged by using technology of imparting and enhancing vocational skills [30]. The RPL has gained more importance in recent years as it is seen that employees learn from their experience overtime and this has helped become efficient, find innovative ways to further their work and learn more skills [41]. Goh & Zukas in their paper state "Theoretically, the findings also extend Bourdieu's thinking, where existing cultural capital in the form of subject knowledge which is valued in one context does not necessarily help the learning of individuals in becoming a vocational teacher in another context" [22]. However, this study findings with most respondents and interviewees agreeing that the experience of handling a task makes the task handling of similar nature far easier and more efficient. A teacher teaching science can apply the experiences of teaching to mathematics, statistics or business with minor modifications, not so much on the topic but on the feel of teaching the topic [46].

VII. Contribution to the Research

The article has given direction to the future of education by imparting vocational skills and competencies to learners and to workplace learning for certification and for employability opportunities. The RPL of skills already acquired and hands on experience are given to make it easy for future education and to save time for the candidates. Examples have been cited for use of new technologies which will enhance the VE which is the future of education. Efforts have been made to make an integrated approach involving the above points, normally discussed separately by earlier researchers. The major contribution is to validate and test reliability of the suggested model using PLS-SEM from collected data which are scarce in this topic. The various theories considered the theory of Experiential Learning, Knowledge and Skills-based Learning, Problem-based Learning, Project-based learning are not fully satisfying the needs of the current learner as the vocational skills acquired, the earlier experience needs to be recognized and the technology will determine the future employability by

providing the employability skills. So, the model developed has been validated and found reliable for these relationships suggested.

VIII. Limitations and Future Research Recommendation

The limitation is the time frame and the time it would take to look at all the aspects of VE in imparting skills & competencies. The benefits and the technology application to education has been very limited till now due to the resistance from the academicians and the people managing this sector. So, the material available is limited as less research has been directed at those aspects. The gap still exists at the full potential usage of technology to education and involvement of all stakeholders leading to scale of volumes, efficiency, quality improvement, new innovations in education [60]. The RPL experience has not been used vastly to give credit for hands on experience and skills earned at various situations due to lack of documentation or credit hours, points associated to this area. A standard system can be formulated for this purpose [29].

IX Conclusion

It is for sure the vocational skills imparted, the RPL and the technology are the main enablers for transforming the education in the current scenario of COVID-19, which is priority for social distancing. The modern technology tools enable education to reach out and promote distance learning, online programs and e-learning. Education is poised to change for all participants; the learners, the teachers, the administrators, the awarding bodies, the academicians, the society in totality.

Transformation model is applicable to educational system that considers using lean principles, continuous improvement to improve the current system. The goal is to develop a model, which shows how the lean principles can be used to transform the university system [2], [27].

The objectives and goal of the research that are the portrayed by the conceptual model, showing the relationship between vocational skills, RPL, technology leading to future employability, have been achieved. This is the contribution of the research study to the future education.

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