Determinant Model of Graduate Competence Partnership-based Life Skills Training in the Industry 4.0 Era

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ABSTRACT

The competence of life skills training graduates in the industrial era 4.0 must be in line with the needs of work competencies and adapt 21st century skills, but the results of the evaluation of training programs at the Institute of Courses and Training (LKP) show that the absorption of training graduates is still low, ranging from 35%-44%. The research objectives are (a) to identify the validity and reliability of indicators of factors that play a role in the competence of graduates of life skills training; (b) to obtain a causal relationship model of determinant factors on the competence of graduates of life skills training based on partnerships with industry. The research method uses a quantitative approach designed with expost facto research. Data collection techniques with a scaled questionnaire. The research population was graduates of life skills training at the Semarang City Course and Training Institute (LKP) in the last 3 years. The sampling technique used simple random sampling 163 respondents. Data analysis using structural equation modeling with Confirmatory Factor Analysis to obtain overall model fit. The results of the research compiled a determinant model of the competence of graduates of life skills training is the alignment factor of the soft skills and hard skills learning outcomes curriculum integrated with industry competency needs, learning methods apply internship systems, product based training, on the job training with industrial partners, alignment of learning facilities and infrastructure based on information technology and process evaluation factors and the end of training learning with competency certification tests. Recommendations for Courses and Training Institutions in developing curricula to equip 21st century skills-oriented life skills graduate competencies, including soft skills competencies of critical thinking, creativity, digital literacy, collaboration and emotional intelligence and hard skills by conditioning learning in collaboration with industrial institutions.

Keyword: Curriculum Alignment with Industry, On the Job Training, IT-Based Infrastructure, Life Skills Training, Graduate Training Competencies

INTRODUCTION

The industrial revolution 4.0 has an impact on job disruption and the emergence of new types of jobs that require digitalization competencies (Ahmad, 2018). In this industrial era 4.0, life skills training programs play a very important role in equipping life skills for the younger generation in accordance with the needs of digital-based industries (Ahmad, 2018; Mutohhari, Sutiman, et al., 2021; Saimon et al., 2023). Systematically designed and exclusive training programs are highly effective in improving the performance of employees working in travel agencies operating in Delhi, India (Arwab et al., 2023). Participation in life skills training programs that utilize digital technology has an effect on the unemployment status of vocational and vocational graduates (Wijaya & Utami, 2021). Course training programs and life skills training in Indonesia focus more on vocational skills.

The problem is that the absorption of training graduates in employment is 35% (Rojaki et al., 2021). Indicating that life skills have not been effective. Analysis of the low absorption of life skills training graduates in the workforce is caused by: (a) Managers of course and training institutions do not integrate learning outcomes with labor market stakeholders, thus increasing unemployment (Mayombe, 2017). (b) The activeness and creativity of trainees during the learning process is still low, the learning method is not learner-centered,

not contextualized according to the workplace (Amtu, 2021; Nugrawati, 2017; Amtu, 2021; Nugraha et al., 2020). (c) Instructors' competence in applying digital technology is low, because they are not digitally literate (Bayram, 2021). (d) The competence of training graduates is relevant to the competencies of industry and the business world, which is still low because it prioritizes hard skills (Basir et al., 2022; Bruri, 2017; Mutohhari, Sofyan, et al., 2021).

(e) The factor of the absence of cooperation between training institutions and the industry has an impact on the mismatch of the competence of graduates (Suminar, Arbarini, Saputri, et al., 2021). The competence of graduates does not meet industry competency standards as happened in South Africa (Mayombe, 2017). Therefore, a link and match between training and the competencies required in the industry is needed (Azman et al., 2020. This phenomenon is analyzed as the root of the problem. employment of graduates of training course institutions, especially in industrial and business employees is still low (35-45%). (Gao, 2019; Mutalimov et al., 2021).

The challenge of managing courses and training to improve the competence of industry-standard graduates is to pay attention to the learning management component of training based on partnerships with IDUKA (Jeronimo et al., 2020; Trilling & Fadel, 2009) and the suitability of the link and match training curriculum with the industry (Farmad et al., 2020; Farmad et al., 2023). The government seeks to realize the competency achievements of course and training graduates by reforming learning management based on industry and business partnerships (Sakarinto, 2020; Wartanto, 2020).

. The learning management component of courses and training includes, the first component, learning objectives prioritize work competencies that are multi-skilled soft skills and hard skills with character (Astuti et al., 2021; Khan et al., 2022; Perisic et al., 2023; Ratih et al., 2023). The potentials needed by industry, business and the world of work are life and career skills, learning and innovation skills, and information media and technology skills (Astuti et al., 2021; Findeisen & Wild, 2022). The competencies of graduates of life skills courses and training in the industrial era 4.0 include critical thinking competencies, creativity, digital literacy, virtual collaboration, communication, problem solving, and emotional intelligence (Mutalimov et al., 2021; Ngoasong, 2018; Wagiran et al., 2019). Therefore, the alignment of the course and training curriculum with industry needs, focuses more on learning outcomes that can deliver training program targets to think critically and creatively in problem solving, understand digital literacy.

The second component, digital technology learning process (Mutohhari, Sutiman, et al., 2021). The learning process is designed with on-the-job training applying dual system (Leppel et al., 2012; Shu-Rung, L. & Chun-Chieh, 2017; Waddoups, 2021)., apprenticeship model (Muslih, 2014; OongKomar, 2017), industry-standardized teaching factory model (Anik Kusmintarti, Sidik Ismanu, Ayu Sulasari, 2022; Khoiron, 2016; Mourtzis et al., 2021). effective in improving graduate competencies.

The third component, the factor of revitalizing the quality of work practice learning facilities and infrastructure, affects the competence of graduates (Anam, 2021; Hadi, 2013; Rasche et al., 2023). Learning technology with digital transformation connectivity, greatly develops skills that encourage the ability of educators, teachers, and trainers to overcome learning problems (Abramuszkinov & Me, 2023; Astuti et al., 2021). The use of digital infrastructure means access to advanced computing infrastructure can support resource-intensive work that runs efficiently (Etzkowitz & Zhou, 2017; Rasche et al., 2023).

The fourth component, training evaluation with industry-standard professional competency certification tests, is effective in improving graduate competence (Azman et al., 2020; Fachul Nur Rohmah, Sonhaji, 2017). Evaluation of training with industry standard professional certification tests is also effective in improving the competence of graduates (Meng et al., 2023; Rojaki et al., 2021; Urbancov et al., 2021; Zuhairoh et al., 2021).

The novelty in this research is that the learning outcomes in the training curriculum, in addition to prioritizing creative economy hard skills, must also be soft skills-oriented to humanize humans to grow naturally and have democratic character (Eka Tuah et al., 2021; Nurwardani, 2016; Sudira, 2011). This strategy is also in line with the government policy of the Indonesian Ministry of National Education to implement an independent curriculum oriented towards the character values of Pancasila (Marisa, 2021). The curriculum fully contributes to the future of the Indonesian nation because it is a reflection of the formation of character education (Suminar, Arbarini, Shofwan, et al., 2021).

The importance of the research contribution is that the determinant model of the competence of graduates of life skills training in the industrial era 4.0 can be used as a guideline for strategies to improve the competency qualifications of course and training graduates, according to reliable and valid indicators. The competence of life skills training graduates is very important to improve their qualifications in order to be able to face the challenges of labor market competitiveness in the industrial era 4.0 (Agarwal, 2022; Ali et al., 2020;

Yohana, 2020). The implications of applying this determinant model can increase the absorption of graduates of life skills courses and training in the world of work, so as to overcome unemployment and poverty in the community (Celume & Korda, 2022; Michaelides & Davis, 2020; Temenggung et al., 2021; Walidayni et al., 2023). In contrast to the benefits of life skills training for adolescents in Iran, it is effective in increasing self-esteem after experiencing asocial behavior (Mohamadi, 2011). The importance of life skills for students in Indian Schools from the perceptions of teachers and principals is to increase self-awareness (personal skills), effective communication skills and problem-solving skills (Antony, 2023).

The specific objectives of the research are (a) to identify the validity and reliability of indicators of factors that play a role in the competence of graduates of life skills training to prepare workers; (b) to find a causal relationship model between factors that are thought to affect the competence of training graduates from the perspective of learning management based on partnerships with industry, so as to obtain a relationship model of determinant factors on the competence of graduates of industry-standard vocational training.

METHOD

The research design of this study uses a quantitative, positivistic approach, with an expost facto research design. (Creswell, 2017). The purpose of this research is to find causal variables without directly manipulating the variables**.** Statistical correlation form with structural equation modeling steps (Structural Equation Modeling) (Blunch, 2017; Ternera et al., 2022). The research measurement model uses Confirmatory Factor Analysis AMOS (Analysis Moment Structures) (Arbuckle, 2016; Ghozali, 2017). The study population was graduates of life skills training based on industry partnerships at LPK Semarang City for the last three years (2020-2022). The number of life skills training graduates and the average employment or self-employment rate are presented in Table 1.

Table 1. Research Population Based on Number of Graduates and Job Absorption

Year	Training graduates	Job uptake/self- employment	Percentage (%)
2020	512	359	70,31%
2021	240	44	18,33%
2022	848	368	43,39%
Total	1600	771	44,01%

In general, the number of samples used in SEM is between 150 and 400 data. If the data used is too little (below 100 data) with a large number of indicators (above 30), the output will be very biased. Likewise, if the data used is too much (above 400 data), AMOS produces output that shows a model that is not feasible to explain certain problems and hypotheses. Based on these provisions, in this study, which has 5 latent variables and (constructs) and each construct has 3-5 indicator items, the number of samples that are sufficient is around 100 - 150 data (Ghozali, 2017).

The research instrument used a Likert scale questionnaire addressed to graduates of life skills training at the Institute of Courses and Training for the last 3 years (2020-2022). The questionnaire instrument was designed to measure 16 constructs consisting of 1 dependent variable (endogenous) and 4 independent variables (exogenous). The endogenous variable of competence of graduates of industry-standard life skills courses and training consists of 5 indicators, namely the ability to think critically solve problems, think creatively and innovatively, digital literacy, collaborate and emotional intelligence (character). Meanwhile, the independent variables (exogenous) include four variables. First, the variable alignment of the training curriculum with industry competencies, measured by 3 indicators, namely the profile of graduates, curriculum structure and learning tools.

Second, the variable of digital-based learning methods, measured from 2 indicators, on the job training/ internship / production practice, and off the job training. Third, digital-based learning infrastructure variables, measured by 3 indicators, namely the availability of physical facilities, digital learning resources and digital learning media. Fourth, training variables and evaluation, consisting of 3 indicators, namely formative evaluation, summative evaluation, and industry standard competency test evaluation. The instruments were analyzed for item validity and reliability. The validity of the instrument is calculated by product moment correlation, the coefficient is valid, r count> r table, at a significance of 0.05. Instrument reliability was calculated to meet the α coefficient (Cronbach's alpha), above 0.6.

Research data analysis using Structural Equation Modeling and hereinafter abbreviated as SEM (Abrahim et al., 2019; Ghozali, 2017). Data analysis begins with normality test and multicollinearity test, using multisample, identification, estimation of asymptotic covariance matrix, measurement model fit test with confirmatory factor analysis, model modification and evaluation of structural model fit test. All data analysis processes were carried out using AMOS version 24 software (Adha, 2023; Arbuckle, 2016).

RESULTS AND DISCUSSION

The overall data measured are five latent variables in a single confirmatory factor analysis (CFA) procedure. The measurement items for each latent variable with descriptive statistics and standardized CFA loadings, are presented in Table 1. Based on the data in Table 1, it can be explained that the combined reliability of the five variables used in this study ranges from 0.696 (learning method variable) to 0.900 (infrastructure variable). Meanwhile, the value of the variance extracted from the five variables used in this study ranged from 0.535 (learning method variable) to 0.680 (infrastructure variable). These values indicate that the combined reliability value and the extracted variance value of the five variables are acceptable because the combined reliability value is above the 0.6 standard. Reliability testing uses Cronbach's alpha (α) technique which states that a questionnaire is reliable if it has an alpha value above 0.6. Construct Reliability (CR) on all latent variables is greater than 0.6, meaning it is reliable. The value of the variance extracted is above 0.50. Thus, it can be stated that the sixteen observed variables and five variables used in this study are declared reliable.

Table 1. Confirmatory Factor Analysis Results

Constructs	Variables and measurement items	Factor loading	Description
Alignment of curriculum and training materials for soft and hard skills integrated with IDUKA needs (three items; CR (Construct Reliability) = 0.860; AVE = 0.672) = Reliable			
CA1	Graduate profile according to IDUKA competency needs	0.807	Valid
CA2	Curriculum structure in accordance with work standard competencies	0,8	Valid
CA3	Learning tools support learning outcomes	0.852	Valid
Digital-based learning method (two items; CR= 0.696; AVE = 0.535) = Reliable			
LM1	On the job training to achieve work competence maximizes practice	0.773	Valid
LM2	Off the job training, the learning process values the experience of learning outcomes	0.688	Valid
Learning infrastructure facilities (three items; CR = 0.900; AVE = 0.680) = Reliable			
I1	The availability of physical facilities supports conducive learning conditions	0.84	Valid
I2	Digital media availability supports learning interaction	0.751	Valid
I3	Availability of learning resources supports effective. learning	0,81	
Learning Evaluation and Competency Test (three items; CR = 0.784; AVE = 0.548) = Reliable			
CTE1	Program evaluation is formative to obtain information. about program shortcomings.	0.735	Valid
CTE2	Program evaluation is summative to obtain decision. data on the sustainability of a training program.	0.752	Valid
CTE3	Evaluation of learning outcomes applying standardized certification competency tests as needed	0.735	Valid
Graduate Competencies (five items; CR = 0.78; AVE = 0.553) = Reliable			
CG1	Able to apply competence to solve problems by reasoning logically and critically (critical reasoning)	0.672	Valid
CG2	Able to describe information in detail from different perspectives (creative thinking)	0.637	Valid
CG3	Able to utilize information technology (digital literacy) consistently in problem solving	0.642	Valid
CG4	Able to contribute to a work group team (collaborate)	0,756	Valid
CG5	Able to adapt to the work environment and motivate yourself to progress (emotional intelligence)	0,732	Valid

Based on Table 1, it can also be explained that CFA (Confirmatory Factor Analysis) is to test whether the indicators that have been grouped based on their latent variables (constructs) are consistent in their constructs or not? Based on the data in table 1, it shows that the lowest factor loading of 0.642 on the

endogenous latent variable CG3 (competence of digital literacy graduates) is still above 0.60. Thus, it can be interpreted that the latent variable is consistent in its construct, declared valid.

SEM analysis of model testing refers to previous research.
The structural model of endogenous and exogenous latent variables can be seen in the following figure.
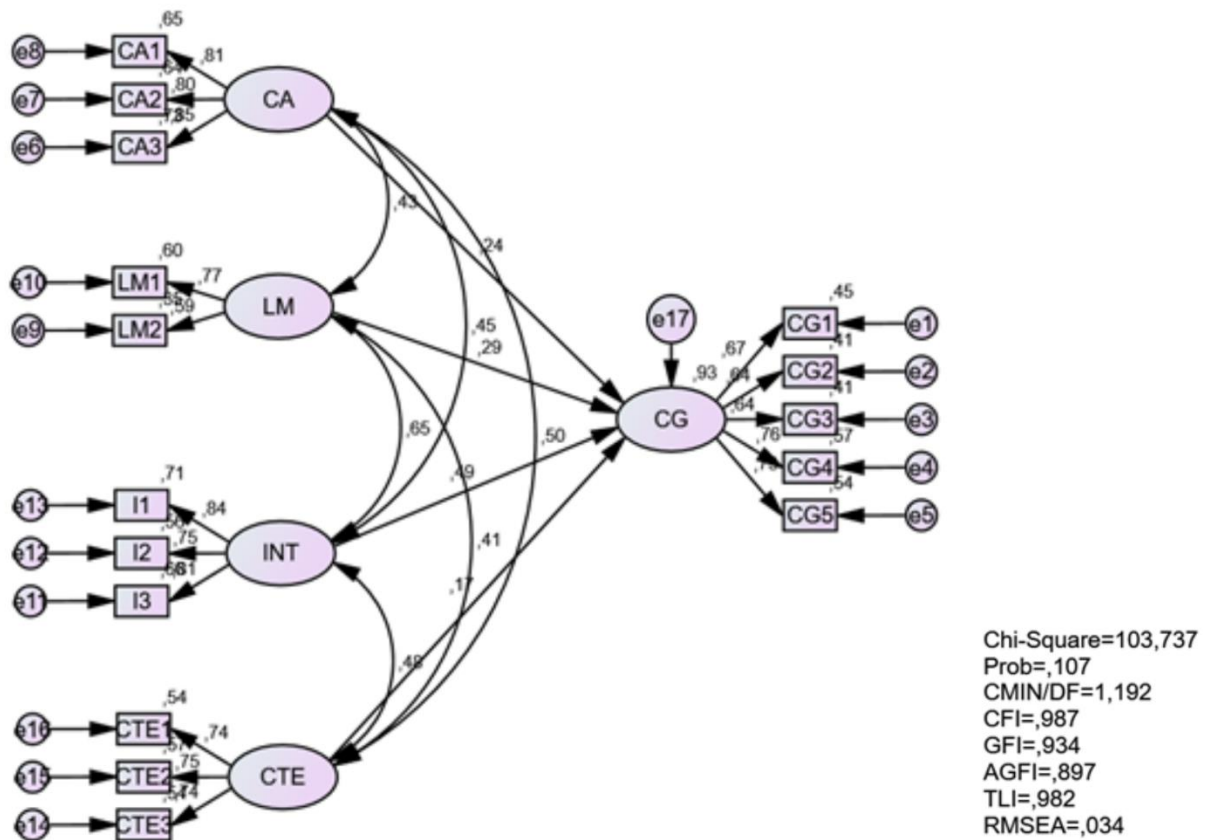

Figure 1. SEM Analysis with AMOS 24.0

Hypotheses refer to previous articles and education system theories: IDUKA's integrated curriculum and teaching materials affect the competence of graduates of Course and Training Institutions (CA → CG), Learning methods affect the competence of graduates of the Institute of Courses and Training (LM → CG), Learning facilities and infrastructure affect the competence of graduates of the Course and Training Institute. (INT → CG), and Competency test evaluation affects the competence of graduates of the Course and Training Institution (CRE → CG).

The next step is to estimate the model using the AMOS version 21.0 application program available with the default model used is maximum like hood estimation. Hypothesis testing is done by analyzing the suitability of the model (goodness of fit) with the fit index to measure the correctness of the proposed model. The statistical assessment of model suitability can be seen in Table 2.

Table 2. Goodness-of-Fit Model Measurement

Parameters	Value	Minimum score	Model Description
Goodness of fit Index		(Cut of point)	
1. Absolute Fit Indices			
X^2 Chi- Square (CMIN)	103,737	Expected small $\leq$ x2α;df	Good
DF	87		Good
Probability	0,107	$\geq$0,05	Good
RMSEA	0,034	0,00 - 0,08	Good
CMIN/DF	1,192	$\leq$2,00	Good
GFI	0,934	$\geq$0,90	Good
2. Incremental Fit Indices			
AGFI	0,897	$\geq$0,90	Moderate

CFI	0,987	≥0,95	Good
TLI	0,982	≥0,95	Good
NFI	0,926	≥0,90	Good
3. Parsimonious Fit Indices			
PNFI	0,672	0,60-0,90	Good
PGFI	0,598	0,00 - 1,00	Good

Based on Table 2, it can be explained that the model estimates with goodness of fit parameters are all in the good category, meeting the standards. Therefore, the model can be categorized as suitable and feasible for use, so that interpretation can be carried out for further discussion.

In the measurement model test, the Chi-square result is 103.737, Degrees of freedom are 87 and probability is 0.107. The test of the model hypothesis shows that this model is in accordance with the data or fit for the data used in this study. The chi square value is quite large, 103.737, but the DF value is more, the Chi Square value will decrease.

Hypothesis Testing

Regression model SEM is a stage that is carried out after the analysis of the prerequisite test has been fulfilled. Testing the analysis of regression coefficients shows the amount of direct effect of one variable on another. The following is a visualization of the SEM regression model analysis test.

Testing of all hypotheses is done by looking at the Critical Ratio (C.R value) (Sutarto et al., 2019) of a causality relationship of SEM processing results, as presented in Table 3.

Table 3. Summary of Analysis Results of Hypothesis Test Structural Model

Regression Path	Regression Coefficient	Estimate	Standard Error	Critical Ratio	Probability	Decision
H1 CG☐CA	0,244	0,153	0,045	3,386	***	H1 Accepted
H2 CG☐LM	0,292	0,268	0,103	2,601	0,009	H2 Accepted
H3 CG☐INT	0,491	0,348	0,075	4,665	***	H3 Accepted
H4 CG☐CTE	0,170	0,146	0,067	2,168	0,030	H4 Accepted

Based on the data in table 3 above, it can be interpreted that the probability value (p) in Hypothesis 1 (H1) is marked with three stars (***) with a critical ratio of 3.386, which shows a significant level of 0.000, which means significant. Thus hypothesis 1 (H1) states that the curriculum and teaching materials for soft skills and hard skills that are integrated with the needs of IDUKA affect the competence of graduates of the Course and Training Institution, is accepted. The results of hypothesis testing show the magnitude of the regression coefficient of 0.244.

The p value in Hypothesis 2 (H2) is 0.009 with a critical ratio of 2.601, which means it is significant. H2, which states that the learning methods of on-the-job training and off the job training affect the competence of graduates of the Course and Training Institution, is accepted. The results of hypothesis testing show the magnitude of the regression coefficient of 0.292.

The p value in Hypothesis 3 (H3) has a three-star sign (***) which means the significance level is 0.000. H3 data with a regression coefficient of ,491 with a critical ratio of 4.665 is declared significant. This means that H3, which states that there is an effect of the availability of learning facilities and infrastructure on the competence of graduates of the Course and Training Institution, is accepted.

The p value in Hypothesis 4 (H4) shows 0.300, meaning that it has a significance level <0.05 with a regression coefficient of 0.170 and a critical ratio of 2.168. Hypothesis 4, which states that there is an effect of competency test evaluation on the competence of graduates of the Training Course Institution, is accepted.

The effect of curriculum alignment and teaching materials for soft skills and hard skills integrated with industry needs on the competence of graduates of the Course and Training Institution.

Courses and Training Institutions have an important role in producing competent human resources and can meet the needs of business and industry. Courses and training institutions as educational institutions that

provide skills for work to their students (Espina-romero et al., 2023; Perisic et al., 2023). The curriculum is developed flexibly following changes in the field of business and industry that are able to respond adequately to the needs of students (Fauzia et al., 2023; Perisic et al., 2023). (Fauzia et al., 2021; Hill et al., 2020; Utanto et al., 2021). For this reason, the Institute of Courses and Training must establish mutually beneficial cooperation between the two parties with the world of industry, business and the world of work starting from curriculum development, implementation, and evaluation (Chen et al., 2021; Koh et al., 2020). This has been done in vocational or vocational education in Indonesia, which has carried out cooperation between vocational schools and industry in several school activities that always involve the industrial world, for example industrial work practices (Prakerin), on job training (OJT), and industrial visits (Astuti et al., 2021; Eka Tuah et al., 2021; Khoiron, 2016; Olazaran et al., 2019, 2019; Tjiptady et al., 2019; Wibowo, 2015). Improving the competence of graduates by developing a curriculum through cooperation between vocational education and training institutions and industry is also applied in Spain (Marhuenda-Fluixá, 2019) and a comparative study between Russia and China (Chen et al., 2021).

Ministry of Education and Culture policy, competencies or learning outcomes of graduates of courses and training institutions refer to the Indonesian National Qualifications Framework (KKNI) and the formulation of competencies resulting from agreements involving parties involved with the world of work or professional organizations (Wagiran et al., 2019). Curriculum development owned by the Institute of Courses and Training is expected to be standardized which is able to help graduates to communicate and solve problems that will be faced in the industrial world, the business world and the world of work, as implemented in universities in Europe, lifelong learning through the project method, aligning extracurricular activities with intracurricular activities (Rouvrais et al., 2020). Curriculum development for vocational education in the medical field in Poland is also recommended for problem solving skills (Borowczyk et al., 2023). In addition, the curriculum in education and training can be realized through the preparation of teaching materials that can be applied in learning, both teaching materials containing soft skills and hard skills in Indonesia (Ningga & Suminar, 2019; Ratih et al., 2023) and also applied to education and training in Malaysia (Basir et al., 2022).

Research results of Caves & Mcdonald (2023) describes the support network of skills training programs in the US provided by employment agencies including on-the- job training, apprenticeships, and professional development by offering better credentials, more able to survive. One of the important elements in the training program is a good curriculum design, it can save the shock of skill acquisition disruption, so as to be able to restore post-covid human resource investment (Bangun & Maranatha, 2022; Nguyen et al., 2015; Urbancov et al., 2021). Likewise, training program organizers in Indonesia, the training programs implemented are required to adjust to industry needs. The implementation of industry 4.0 requires the Industrial Education and Training Center to adapt quickly (Mutohhari, Sofyan, et al., 2021; Nur et al., 2020; Rahargo & Jannah, 2020; Sutarto et al., 2019; Utanto et al., 2021).

In the last 10 years ago, in Indonesia, Courses and Training Institutions using a competency-based curriculum are part of the non-formal education process to improve the quality and productivity of human resources (Agarwal, 2022; Alqudah et al., 2022; B. Owalla, C. Gherhes, T. Vorley, n.d.; Hadi, 2013; Urbancov et al., 2021). The results of other studies that corroborate the test of the hypothesis of this study the effect of a curriculum that is integrated with the work competencies of the industrial world and the world of work on the competence of graduates by Landa et al., (2021). According to Landa et al (2021), there is a gap in employee competency development, due to the incomplete competency matrix in the training curriculum for each employee. Technical competency development training design has not fully referred to the standard criteria for behavior change that is expected to be displayed in the workplace of each unit (Suminar et al., 2023; Sutarto et al., 2021).

The effect of learning methods on the job training and off the job training on the competence of graduates of the Course and Training Institute

The course and training institution as a system is a set of components or elements or sub-systems that interact with each other to change the work competence of employees, so that they can perform better in their positions through the learning process in learning activities. The learning process in training activities has a significant positive effect on improving the competence of graduates. However, the learning process in vocational education tends to be oriented towards strengthening cognitive or academic aspects, not optimizing the ability of psychomotor aspects or skills, which has an impact on low employability (Hyland, 2019). Meanwhile, the implementation of work-based learning with Teaching Factory in vocational education as an application of contextual learning is very effective in increasing the ability of work competitiveness for

graduates (Yoto & Marsono, 2020). Practical learning with infrastructure in training contributes to increasing financial benefits for competitive institutions and developing employee careers in Turkey. (Balkar & Karadağ, 2024; Jenner & Gustavsson, 2023).

Siregar (2018) explains that in the context of the system there is a cause-and-effect relationship consisting of 3 components, namely input, process and output. The input component is the curriculum according to the needs analysis and infrastructure. The process component includes learning and learning methods and administration, while the output component includes graduate competencies and organizational performance. Adequate methodology in conducting training, complemented by e-learning innovations in the Moodle Learning Platform, can effectively maximize the capacity of trainees and contribute to profitability and organizational value (Perisic et al., 2023; Yang et al., 2018). Similarly research results of Kwok et al. (2019; Zeng et al., 2023) the application of training methods by utilizing advances in communication technology such as virtual collaborative simulation-based training (VCST) is very effective for improving management skills competencies. Training by applying technological advances in its learning methods can increase self- efficacy and engineering students' interest in entrepreneurship (Asniwati, 2020; Belmonte et al., 2022). Thus, it can be concluded that IT-based training methods in the current digital era are effective for increasing knowledge and developing skills according to the training program.

Other research in Tanzanian course institutions perpetuates traditional teaching practices, which reduce opportunities for learners to participate in global democratic activities. The impact shows that teaching practices for Communication Skills Courses in Tanzania cannot enhance the development of the 4 Cs (critical thinking, communication, collaboration, and creativity) among learners. Thus, a learning method practiced by instructors at the course institution affects the 4 Cs competencies (Nela Noviarti1, Hanif Al Kadri, Irsyad Irsyad, 2023). Professional instructors are responsible for creating a learning environment conducive to the achievement of learning objectives and safe learner satisfaction (Nakar et al., 2023). (Nakar et al., 2023).

The effect of the availability of learning facilities and infrastructure on the competence of graduates of the Course and Training Institution

The results of this third hypothesis test are in accordance with the results of Rina's research (2020) explains that the readiness of facilities and infrastructure effectively improves the quality of education in the face of industrial progress 4.0. Technologies that support learning, connectivity, storage infrastructure, guidelines, practices that promote innovation, digital transformation, greatly develop skills that encourage the ability of educators, teachers, and trainers to overcome learning problems by skillfully using digital infrastructure. Instructors or educators must have access to advanced computing infrastructure that can support resource-intensive work that runs efficiently. (Etzkowitz & Zhou, 2017; Rasche et al., 2023). Computing infrastructure, can ensure work is completed quickly, not experiencing long wait times. Infrastructure affects instructor performance and impacts student learning achievement (Nela Noviarti1, 2017; Nela Noviarti1, Hanif Al Kadri, Irsyad Irsyad, 2023).

Research in China, designing teaching that combines smart classrooms and virtual simulation training can be applied to realize online blended teaching and classroom informatization, improving academic performance and self-efficacy (Abdullah Muksin, 2019). Today, industry 4.0 has created a network connection between humans and machines. Digitalization pervades every part of life, including in the implementation of learning in courses and training institutions (Perisic et al., 2023). Digital competence is no longer an expectation, but an obligation for instructors and managers of courses and training institutions. The positive impact of digital infrastructure utilization and frequency of Internet use on increasing digital skills competence (Astuti et al., 2021). Participants in courses and training in Galaxy Europe and the Gallantries project stated that the use of digital infrastructure can get the job done faster (Rasche et al., 2023).

The effect of course and training evaluation on the competence of graduates of the Course and Training Institute

Digital competence in 21st Century organizational life includes all parts of the comprehensive development of industry 4.0. The results of a meta-analysis of factors that determine economic growth are not money capital but innovation in an organization, especially those engaged in entrepreneurship (Saha & Petr, n.d.). (Saha & Petr, n.d.). There is a paradigm shift, which was originally a knowledge-based economy, has now changed rapidly. 21st century digital skills increase the competitiveness and innovation capacity of organizations (Michaelides & Davis, 2020). (Michaelides & Davis, 2020).

Competency-based evaluation of training practices using standardized assessments of trainee competencies, contributes to better training outcomes without extending the duration of training (Miranda et al., 2020; Urbancov et al., 2021). Competency-based training can result in up to 18% greater improvement in adequate competencies, when compared to regular training. This Lebanese study also resulted in recommendations to further enhance the benefits of competency-based training strategies as a human capital investment. (Abdullah Muksin, 2019). Acceptance of this research hypothesis is corroborated by the results of training research in the economic field of accounting skills. There is a positive and significant effect of the accounting competency test model variable on the implementation of the accounting competency test of 0.638. The magnitude of the direct effect of the accounting competency test model on the competence of work-ready graduates is 0.423, while the magnitude of the direct effect of the implementation of the accounting competency test on the competence of work-ready graduates is 0.443. Factors that determine the success of the competency test for trainees are learning competencies that apply the competency- based training approach (Suminar, Arbarini, Saputri, et al., 2021), the competency of industrial practice with the application of work-based learning and the competence of implementing Production and Service Unit activities (Abdullah Muksin, 2019).

CONCLUSION

The model of determinants of competence of graduates of courses and training based on partnerships with industry consists of 4 components or factors that are significantly tested, namely: first, the alignment of the curriculum, teaching materials and tools with digital literacy, integrating with the needs of industry, business, and employment. Second, digital-based on the job training and off the job training learning methods applied to courses and training activities. Third, the components of infrastructure and facilities supporting learning oriented towards work theory and practice, both physical facilities, learning resources and digital-based learning media in the business and work world industry. Fourth, the application component of learning outcomes evaluation includes formative, summative and industry standard competency certification test evaluations. This model can be a concern and consideration for managers of courses and training institutions in ensuring the quality of the institution, so that the existence of courses and training institutions can achieve its mission of providing quality education services, competitive in the 21st century era. Suggestions for further researchers, hypothesis testing by placing the intervening variable of training instructor competence as part of the determinants of the competence of course and training graduates. Based on the results of this study, the four learning components that have been tested significantly, the subjects who apply are training instructors who have a set of competencies according to their main duties and functions.

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