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Developing a life skills-based teaching factory model for *kejar paket C* photography training

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ABSTRACT

This study aimed to develop and validate a life skills-based teaching factory model for photography training in the Kejar Paket C equivalency program to address the limited application of teaching factory in nonformal education. The study employed development research using the Four-D (Define, Design, Develop, Disseminate) model. The model was tested through limited and wider field trials involving learners from two Community Learning Centers in East Java. Data were collected using validated instruments and analyzed through expert validation, paired-sample t-tests, and normalized gain scores. The model was rated highly feasible and practical by experts, tutors, and learners. It also produced significant improvements in cognitive, psychomotor, and affective learning outcomes across both trial stages. The life skills-based teaching factory model is feasible, practical, and effective for photography training in nonformal equivalency education, providing an evidence-based framework for integrating vocational competence and life skills within Community Learning Centers.

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Introduction

Education has increasingly become a strategic mechanism for developing human resources capable of responding to rapid social, economic, and technological changes. In the twenty-first century, educational success is no longer determined solely by the accumulation of knowledge but by learners' ability to apply knowledge, adapt to changing environments, solve problems, and participate productively in society and the labor market (Sukmayadi and Yahya 2020). This perspective is consistent with UNESCO's framework, which emphasizes that education should develop critical thinking, collaboration, communication, and creativity through the four pillars of learning: learning to know, learning to do, learning to be, and learning to live together (UNESCO 1996). However, this challenge remains particularly significant within nonformal education pathways, where learners often require educational models that directly connect learning experiences with practical competencies and employment opportunities.

The urgency of strengthening vocationally oriented nonformal education is evident in East Java, Indonesia, where labor absorption remains a challenge despite improvements in employment indicators. The province recorded an open unemployment rate of 3.61% in February 2025, while Surabaya City and Sidoarjo Regency reported higher rates of approximately 4.84% and 5.75%, respectively (BPS Jawa Timur 2025). These conditions indicate that access to education alone is insufficient unless accompanied by competency development that corresponds with labor market demands. Within this context, Community Learning Centers (Pusat Kegiatan

Belajar Masyarakat/PKBM) have a strategic role because Law No. 20 of 2003 positions nonformal education as a complementary, supplementary, and alternative pathway to formal education. Therefore, learning programs in PKBM should move beyond knowledge transmission toward contextual, productive, and competency-based learning approaches that enable learners to achieve economic independence.

One instructional approach with strong potential for this transformation is the teaching factory (TEFA) model. The philosophical foundation of TEFA can be traced to Prosser's vocational education principles, which emphasize that occupational competence is best developed through learning environments that replicate authentic workplace conditions (Yunus 2023). This concept is further supported by constructivist learning theory, which argues that meaningful learning occurs through direct experience and active knowledge construction (Komara and Iskandar 2025). Internationally, TEFA reflects the principles of the German dual system, integrating classroom learning with workplace-based practice (Chryssolouris, Mavrikios, and Rentzos 2016). In Indonesia, TEFA has been institutionalized as a production-based learning approach that integrates education with real production or service processes aligned with industry standards (Direktorat Pembinan SMK 2017; Perdana 2018). Previous studies have demonstrated that TEFA contributes to improving creativity, production competence, entrepreneurial orientation, motivation, and learning outcomes among vocational learners (Kautsar et al. 2022; Sukarna, Suartana, and Gotama 2023; Sutianah et al. 2024). Nevertheless, most TEFA implementations remain concentrated in formal vocational schools, leaving its adaptation within nonformal education contexts insufficiently explored.

The integration of life skills provides an important foundation for adapting TEFA beyond formal vocational education. Life skills represent a combination of personal, social, cognitive, and vocational competencies that enable individuals to manage challenges, make decisions, communicate effectively, and participate independently in social and economic environments (Ali 2011; Chakra and Lavanya 2024). UNESCO (2001) emphasizes that life skills education supports holistic human development by combining knowledge, practical abilities, personal development, and social responsibility. In vocational learning contexts, life skills should not be treated as additional outcomes but as essential components embedded within learning activities, enabling learners to develop technical competence alongside self-management, teamwork, creativity, and decision-making abilities (Kizhakkethalackal and Deepa 2024). This approach is particularly relevant for nonformal learners, whose educational backgrounds, ages, and learning motivations differ significantly from students in formal vocational institutions.

Despite the growing evidence supporting TEFA and life skills integration, a significant research gap remains. Existing studies, including those by Maksum et al. (2024), Setiadi et al. (2025), Sukarna et al. (2023), and Sutianah et al. (2024), have primarily examined formal vocational education settings and have not addressed how TEFA principles can be reconstructed for nonformal equivalency education. In particular, photography training within PKBM represents an underexplored context, despite its relevance to the expanding creative economy and opportunities for independent employment. Preliminary observations at PKBM Think Indonesia School in Sidoarjo Regency and PKBM Insan Cerdas Indonesia in Surabaya City indicate that photography training remains focused mainly on technical camera skills, while production management, reflection, work attitudes, collaboration, and entrepreneurial competencies have not been systematically integrated. This condition demonstrates the need for an instructional model specifically designed for the characteristics and needs of Upper Secondary Equivalency Education learners.

Therefore, this study aims to develop and validate a life skills-based teaching factory model for photography training within nonformal upper secondary equivalency education. Unlike previous TEFA studies conducted in formal vocational schools, this research reconstructs the teaching factory concept by positioning life skills as an integral element of the production learning process rather than as an additional learning outcome. The study focuses on three fundamental questions: (1) how feasible is the developed model according to expert validation, (2) how practical is the model for tutors and learners, and (3) how effective is the model in improving cognitive, psychomotor, and affective learning outcomes. By addressing these questions, this study contributes both theoretically and practically by extending the application of teaching factory from formal vocational institutions to nonformal education settings and providing an empirically tested framework for PKBM institutions, policymakers, and creative industry partners in developing productive and meaningful learning pathways.

Method

This study used a development research design to produce a validated instructional product: a life skills based teaching factory model for photography training, together with three supporting instruments (an implementation guidebook; a jobsheet based teaching module; and a block system lesson plan). The study adopted the 4D model (Thiagarajan, Semmel, and Semmel 1974), consisting of four stages: Define, Design, Develop, and Disseminate,

as shown in Figure 1. This model was chosen because it is oriented specifically toward instructional tool development, and because its Define stage requires an explicit learner analysis, suited to mapping the profile of Kejar Paket C learners prior to product design.

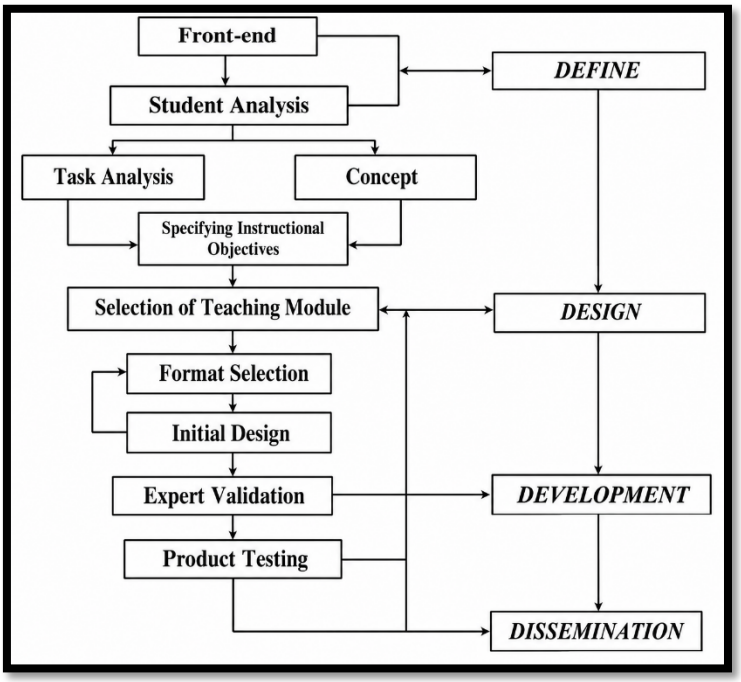

Figure 1. Development procedure of the 4D model.
Source : (Thiagarajan et al. 1974)

Subjects were Kejar Paket C learners at two partner institutions: PKBM Think Indonesia School (Sidoarjo) and PKBM Insan Cerdas Indonesia (Surabaya). A limited developmental trial involved 7 learners at PKBM Think Indonesia School; a wider validation trial involved 14 learners across both sites (8 and 6, respectively). Sampling was purposive, based on active enrollment rather than random selection, suited to the study's developmental scope and limited learner population per site. Photography tutors served as implementers; three categories of expert validators (content/design/media) assessed the product prior to field testing.

Data were collected using six instruments corresponding to the study's three quality criteria, summarized in Table 1.

Table 1. Research instruments, respondents, scales, and purposes

Instrument	Respondent	Scale	Purpose
Expert validation questionnaire	Content/design/media experts	4 point Likert	Assess model feasibility
Response questionnaire	Learners & tutors	4 point Likert	Assess ease of use/perceived benefit
Syntax implementation sheet	2 trained observers	Rating checklist	Monitor fidelity per TEFA stage
Cognitive test	Learners (pretest/posttest)	Multiple choice	Measure knowledge gain
Product assessment rubric	2 raters	Performance rubric	Assess photographic product quality
Life skills observation sheet	2 observers	Rating scale	Track personal/social/thinking/vocational skills

All instruments underwent expert judgment (mean score 3.65; 91.18%, indicating strong content validity) followed by empirical tryout on 15 Kejar Paket C learners outside the main sample. Validity was tested using Pearson product moment correlation; reliability was tested using Cronbach's Alpha (single rater instruments) and the Intraclass Correlation Coefficient/ICC (dual observer instruments). Results are summarized in Table 2 and Figure 2.

Table 2. Validity and reliability results per instrument

Instrument	Validity result	Reliability coefficient	Category
Cognitive test	17/25 items retained	Alpha = 0.921	Very high
Response questionnaire	13/14 items retained	Alpha = 0.905	Very high
Syntax implementation sheet	Confirmed via expert judgment	ICC = 0.909	Very high
Product assessment rubric	Confirmed via expert judgment	ICC = 0.805	High
Life skills observation sheet	8/8 indicators retained (r = 0.808 to 0.948)	ICC = 0.784	High

Feasibility and practicality scores were each averaged and classified into four categories (Rohmad & Sarah, 2021), while effectiveness was analyzed across the cognitive, psychomotor, and affective (life skills) domains. Normality was tested using Shapiro Wilk (suited to $n < 50$); this assumption was met, so a paired sample t test determined the significance of pretest/posttest improvement, and the normalized gain formula (N Gain) determined its magnitude. Classification criteria are summarized in Table 3.

Table 3. Classification criteria for feasibility, practicality, and effectiveness

Aspect	Category	Criterion
Feasibility/practicality	Highly feasible/practical	Mean score 3.00–4.00
Feasibility/practicality	Feasible/practical	Mean score 2.00–2.99
Feasibility/practicality	Not feasible/practical	Mean score 1.00–1.99
Effectiveness (N Gain)	High/highly effective	$g > 0.70$
Effectiveness (N Gain)	Moderate/reasonably effective	$g = 0.30–0.70$
Effectiveness (N Gain)	Low/minimally effective	$g < 0.30$

The model was deemed effective when the paired t test was significant ($p < 0.05$) and mean N Gain reached at least the moderate category. The two site trials were not intended for cross site statistical comparison; rather, they tracked consistency of improvement as the model was refined and applied across two nonformal education contexts.

The study spanned 6 months following the 4D sequence (Figure 1): Define/Design in months 1–3; Develop (expert validation, developmental trial, validation trial) in months 4–5; Disseminate, together with manuscript preparation, in month 6.

Three limitations should be noted: (1) the small, purposively selected sample, confined to two institutions in East Java, warrants cautious generalization; (2) the pre experimental one group pretest posttest design lacked a control group, so gains cannot be fully isolated from maturation or extraneous influences, though consistency across two independent sites supports the credibility of the observed effect; and (3) because trials tracked improvement trends rather than compared sites statistically, strong causal claims about differential institutional effectiveness are not warranted.

Results and Discussions

The products developed in this study consist of a life skills based teaching factory model for photography training, comprising three components: block system based lesson plans, jobsheet-based teaching modules, and a guidebook for implementing the model. The block-system-based lesson plans serve as a scenario for production-based photography instruction, allocated across three blocks of sessions—from order receipt through reflection and after-sales service. The worksheet-based teaching modules are organized in a hybrid format that combines subject matter descriptions with practical work guidelines across six chapters, with each chapter accompanied by one integrated worksheet. The model implementation guidebook serves as a reference for tutors and PKBM administrators on how to implement the model; it is organized into nine chapters covering the model's concepts, supporting tools, assessment, and sustainability strategies. These three products were developed using the 4D development model, which consists of the Define, Design, Develop, and Disseminate stages (Thiagarajan et al. 1974). A summary of the activities and results obtained at each stage of development is presented in Table 1.

Table 4. Summary of Model Development Results Based on the 4D Stages

Stage	Main Activities	Outcomes Obtained
Define	Front end analysis, learner analysis, task analysis, concept analysis, and specification of learning objectives	Identification of the development needs, given that photography learning at both PKBMs remained oriented toward content delivery and had not yet been directed toward a production workflow, quality control, reflection, and life skills integration
Design	Test construction, media selection, format selection, and preparation of the initial design (draft I)	Completion of draft I of the three main products, namely the block system lesson plan, the jobsheet based teaching module, and the guidebook, ready to be validated
Develop	Expert and practitioner validation, revision based on expert validation, limited development trial (N equals 7) at PKBM Think Indonesia School, and revision based on the development trial	The model was declared highly feasible with an average expert validation score of 3.56 and highly practical in the limited development trial
Disseminate	Wide scale validation trial (N equals 14) at two PKBM locations, final product packaging, dissemination, and adoption by tutors and managers of the partner PKBMs	The model remained highly feasible, highly practical, and effective under wider implementation, and was independently adopted by both PKBMs

The conceptual design of the life skills-based teaching factory model and its syntactic flowchart, which served as the basis for the development of the three products, are presented in Figure 2.

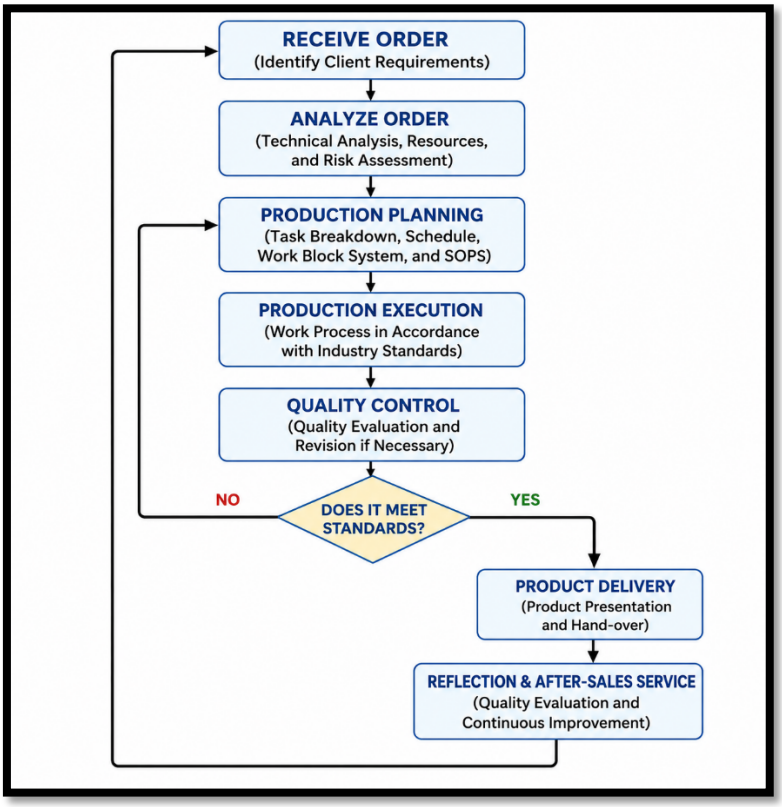

Figure 2. Design of a life-based teaching factory model Processed by the researcher

Based on Table 1 together with Figure 1 and Figure 2, the four development stages produced a final product that underwent validation and trial processes in a staged manner, so that the feasibility, practicality, and effectiveness data described in the following section reflect the product after refinement during the develop and disseminate stages, rather than its initial design.

The feasibility of the model was determined through the assessment of three expert validators on the three products. The content expert gave an average score of 3.50, the instructional design expert gave 3.42, and the media expert gave 3.75, resulting in an overall average of 3.56 out of 47 assessed items, which far exceeded the minimum threshold for the feasible category of 2.50. These findings are presented in Figure 3.

Table 5. Average validation scores from the three experts on model feasibility

Type of Expert	Number of Items	Average Score	Category
Content Expert	12	3.50	Highly Feasible
Instructional Design Expert	19	3.42	Highly Feasible
Media Expert	16	3.75	Highly Feasible
Overall Average	47	3.56	Highly Feasible

This feasibility finding is consistent with the teaching factory concept, which positions educational institutions as industry miniatures where learning is designed around products or services relevant to community needs and workplace demands (Isnantyo et al. 2024; Kautsar et al. 2022; Prihantoro et al. 2025). The high ratings for the alignment of learning materials, objectives, and teaching factory syntax indicate that the model effectively integrates product-oriented learning with learners' psychological development to enhance skills, work readiness, and work character (Nugroho et al. 2023). These findings support previous studies reporting the validity of 4D-based teaching factory models in vocational education (Maksum et al. 2024; Setiadi et al. 2025), while extending their application to nonformal Package C education through the integration of life skills. The model also demonstrated high practicality, as reflected in increased learner response scores (3.01 to 3.31), a high tutor response score (3.575), and improved syntax implementation from less practical (2.453) to highly practical (3.167) between the development and validation trials (Figure 4).

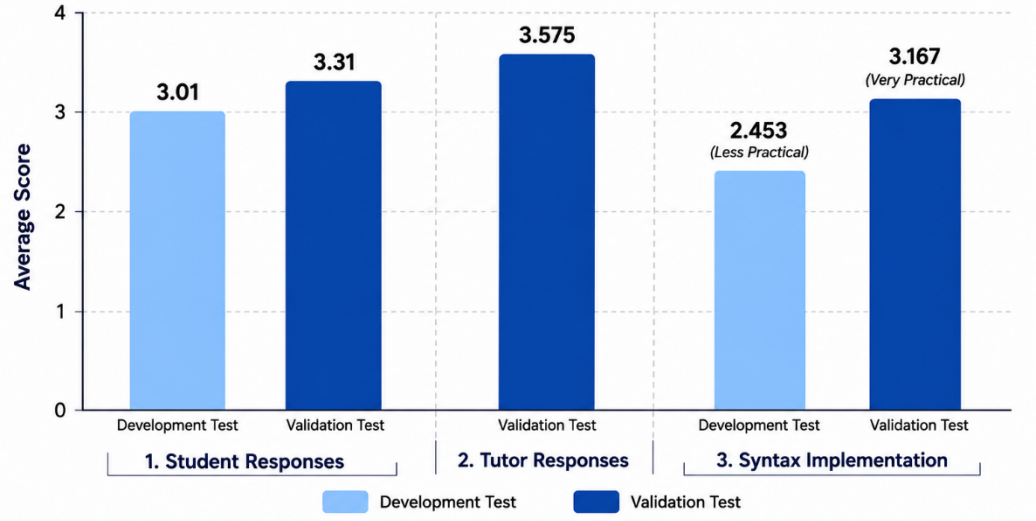

Figure 3. Comparison of practicality scores between the development trial and the validation trial
Source : Processed by the researcher

The consistent improvement across the three practicality aspects indicates that the revision of the products during the develop stage successfully aligned the model design with the heterogeneous characteristics of Package C learners in terms of age and prior learning experience. Learner comments that initially described the jobsheet as difficult and confusing during the development trial but changed to positive impressions during the validation trial reinforce this interpretation. This finding aligns with the view that nonformal education demands a flexible and contextual learning approach (Hisyam 2024) and with the andragogy principle, which emphasizes that adults learn more effectively through direct experience relevant to their practical needs (Knowles 1980). Compared with Maksum et al. (2024) and Setiadi et al. (2025), whose testing was limited to vocational high school settings, this study shows that ease of implementing the production based syntax can be achieved not only in formal education contexts but also in equivalency education with different learner characteristics.

The effectiveness of the model was analyzed across three domains namely cognitive, psychomotor, and affective. In the cognitive domain, the paired sample t test results showed significant differences between pretest and posttest scores at both trial stages, with significance values of 0.000009 in the development trial and 0.0000002 in the validation trial. The average N-Gain increased from 0.761 in the high category to 0.801 in the validation trial, which also fell within the high category. In the psychomotor domain, all learners achieved the

very good category on photo product assessment, with the average score increasing from 3.40 to 3.68. In the affective domain, life skills development increased from the good category at 3.13 to the very good category at 3.55, with the personal skills and social skills dimensions consistently receiving the highest scores while the thinking skills dimension received the lowest score, though it still improved from 2.96 to 3.36. A summary of the effectiveness findings is presented in Figure 5 and Figure 6.

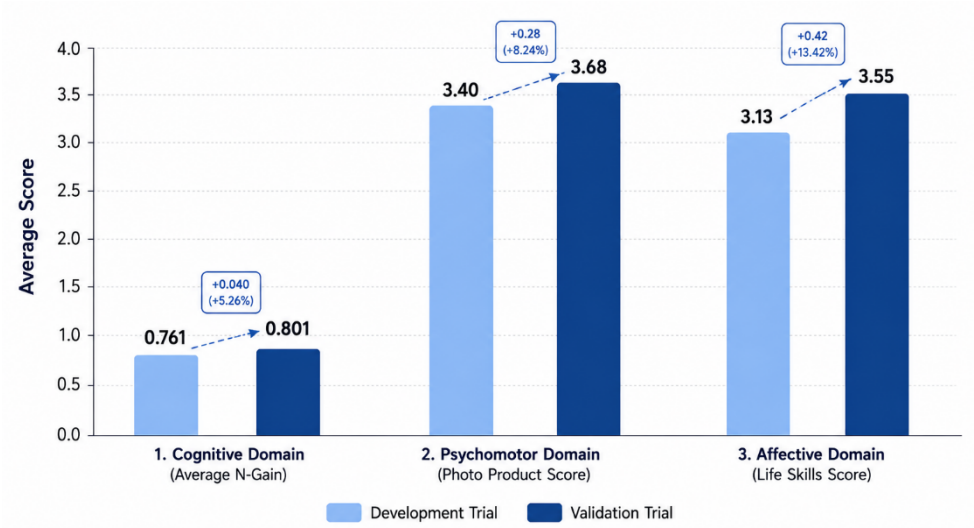

Figure 4. Trend of improvement across the three effectiveness domains from the development trial to the validation trial
Source: Processed by the researcher

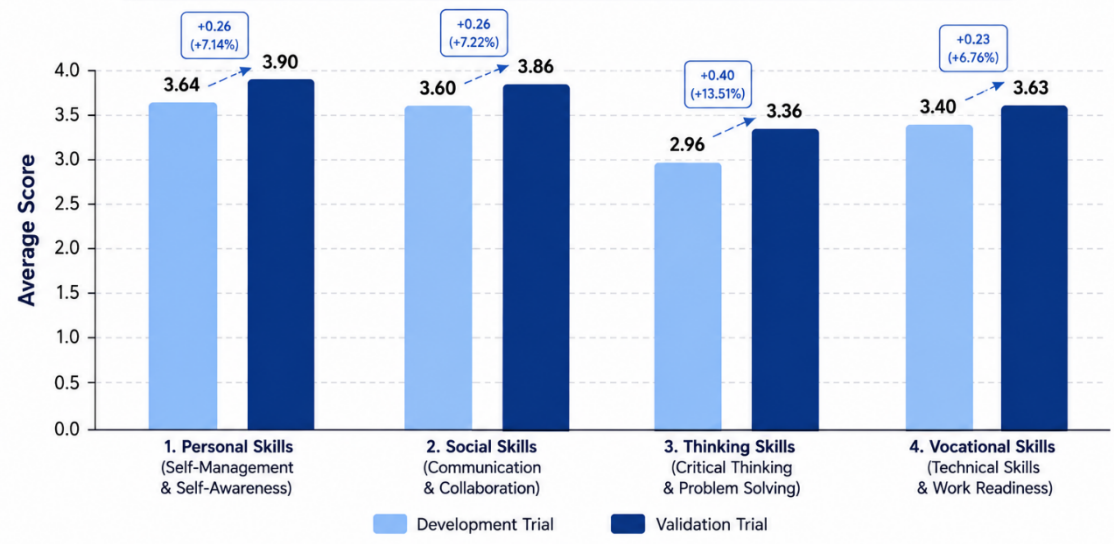

Figure 5. Achievement across four life skills dimensions in the development trial compared with the validation trial
Source: Processed by the researcher

The alignment between the teaching factory syntax and higher-order cognitive processes explains the consistently high learning outcomes at both trial locations. Learners were required to apply photographic procedures, analyze visual composition, evaluate product quality through quality control, and create original photo products according to client needs, corresponding to the cognitive levels from applying to creating in the taxonomy of learning outcomes (Anderson et al. 2001; Shaikh 2025). Repeated production activities also strengthened psychomotor competence by advancing learners from the mechanism stage toward adaptation while reinforcing the technical foundations of photography (Arifin 2012; Darfin, Jannah, and Nurfadillah 2025; Yunianto 2021).

In the affective domain, improvements in personal and social skills reflected the collaborative nature of the production process (Ali 2011; Kizhakkethalackal and Deepa 2024), whereas the relatively lower gains in

thinking skills are consistent with the gradual development of critical thinking competence (Chakra and Lavanya 2024). These findings support previous studies demonstrating that teaching factory and life skills–based learning enhance creativity, collaboration, vocational readiness, and workforce preparedness (Sutianah, Sobandi, Yamin, and Trang 2024; Suminar 2025). The greater improvement observed during the validation trial was likely influenced not only by product refinement but also by learners' and tutors' increasing familiarity with the repeated production process.

This study was conducted in only two PKBM institutions with relatively small samples, comprising seven learners in the development trial and fourteen learners in the validation trial; therefore, its findings should be regarded as preliminary rather than broadly generalizable. Nevertheless, the consistent improvement across the cognitive, psychomotor, and affective domains demonstrates that the life skills–based teaching factory model successfully integrates life skills into every stage of production, providing a practical reference for nonformal education and PKBM implementation (Nugroho et al. 2023; Covaciu 2025). Future studies should involve larger and more diverse samples, apply the model to other creative skill fields, and conduct longitudinal evaluations to examine its long-term effects on life skills, employability, and entrepreneurship.

Conclusions

This study set out to determine whether a teaching factory model, long confined to formal vocational schools, could be reconstructed around life skills to serve the markedly different population of Kejar Paket C learners without losing its capacity to build both competence and character, and the answer across all three anchoring questions is affirmative. In terms of feasibility, the model was validated by content, design, and media experts as highly feasible for production based photography instruction within the Package C context. In terms of practicality, the model proved highly practical for both learners and tutors and, notably, became easier to implement with repeated use, indicating that its production syntax is learnable rather than merely acceptable on paper. In terms of effectiveness, the model produced consistent gains in cognitive, psychomotor, and affective learning outcomes across two independent sites, confirming that a production based approach can strengthen both technical competence and life skills character among learners whose ages, histories, and reasons for returning to education differ sharply from those of students in formal vocational schools.

By treating life skills as a structural component woven into every stage of the production syntax rather than as an incidental byproduct, this study extends the teaching factory literature into a setting it has rarely reached, namely nonformal equivalency education, and gives PKBM managers, tutors, and nonformal education policymakers a working, field tested reference for organizing production based training that builds employable skill alongside personal character. The model should accordingly be read as a promising initial template rather than a finished solution, one that reframes photography training within Kejar Paket C as a structured pathway toward dignified and productive work for learners who returned to education by a path different from most.

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