



## **Collaboration-Based Development Model E-Learning on Course Learning Achievements Working Skills**

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The collaborative development model based on e-learning on specific skills learning outcomes is principally very helpful in increasing student competence in creative skills courses, exploring learning resources, and instilling a critical attitude in students. The research aims to develop a collaboration model based on E-Learning on the learning outcomes of work skills courses and determine the feasibility of the developed learning model. The research method uses the Borg and Gall (1983) development model combined with the Dick and Carey (2005) learning development model. The results showed that the collaboration model based on e-learning on the learning outcomes of decent work skills courses and its conceptual implementation based on the overall learning approach could be applied to facilitate, grow, and develop problem-solving. Providing appropriate and suitable benefits, to increase student understanding through the use of various ICT-based learning resources, and their application directly through e-learning-based UNIMED SIBDA. Activating the learning process and engaging and meaningful in the implementation of learning, carried out actively and enthusiastically trying to achieve the desired learning goals, delivered for various learning modalities (multisensory), higher-order thinking skills, and improving ICT & media literacy skills.

Keywords: collaboration development model, e-learning, learning achievement, creative skills

## **INTRODUCTION**

Mastery of work skills is one of the factors to improve students' ability to become teachers. The work skills course contains components of courses in the field of

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educational studies aimed at providing educational insight in addition to teacher training skills for graduates, as well as the ability to understand and solve educational and teaching problems with their expertise (Häkkinen & Mäkelä, 1996; Darling-Hammond et al., 2020). Many students still think that the Craft Skills Course is difficult to understand. The Craft Skills course generally learns the basics of scientific expertise that underlies the practice and skills to work correctly and put it into practice directly which has goals according to learning outcomes.

Learning at UNIMED Higher Education involves lecturers, students, and other learning resources that can increase interaction to achieve the goals set. This interaction is a deliberate effort to involve and use the professional knowledge possessed to make curriculum goals achieved (Wijngaards-de Meij & Merx, 2018; Girvan et al., 2016). A plan or steps must be prepared by the lecturer when carrying out the learning process so that it takes place effectively (Ketut Sudarsana et al., 2019; Coman et al., 2020). Learning design is not carried out only centered on the role of the teacher, but rather on the role of students who must be actively involved in learning (Milrad, 1998a). New standards are needed so that students will have the competencies needed in the 21st century. Higher education is challenged to find ways to enable students to succeed in work and life through mastering creative thinking skills, flexible problem solving, collaboration, and innovation (Wijayati et al., 2019; von Thienen et al., 2016). 21<sup>st</sup>-century learning has the characteristics that every student is directed to have 4C skills (Chiruguru, 2020; Ratama et al., 2021). These skills are expected to improve the quality of higher education in Indonesia.

Through the presence of E-Learning in higher education, the ICT-based learning process adds to the wealth of knowledge and the development of pedagogical aspects. The interaction between ICT in education can add insight for learning designers towards innovative and creative learning models that have been applied in WSC in all educational study programs and majors with various scientific disciplines at the UNIMED Faculty of Engineering.

In recent years, teachers have used more ICT in their teaching practice, but they use ICT more for class preparation and other assignments than with students in the classroom (Champa et al., 2019; Ghavifekr et al., 2014; Jo Shan Fu & Fu, 2013). What this means is that the process of integrating ICT into the classroom is still a challenge. As a result, lecturers are the actors who determine whether technology resources are integrated into their learning because the ICT integration process will not occur if they do not collaborate.

In this way, the ICT competencies used by lecturers are very important for the ICT integration process, and to relate them to the use of ICT in their teaching practice maintains that it is still necessary to deal with the influence of teaching competencies on ICT to learn about the integration of these resources into practice. teach them (Mirzajani et al., 2016; Ciptaningrum et al., 2021; Valverde-Berrocoso et al., 2021). Develop a relational learning model that describes the complexity of the process of integrating ICT into the classroom.

These models show the need to include knowledge and pedagogy, and technology. For innovative learning models based on E-Learning to be integrated into the classroom, personal factors related to lecturers need to be considered (Pusparini et al., 2018; Febrianto et al., 2020). There is a relationship between each factor and its integration and their interaction to support a more complete analysis of ICT use in the classroom. Acquisition of technological and pedagogical knowledge and skills in ICT will enable lecturers to integrate technological resources through learning resources developed in Higher Education (Shafie et al., 2019; Ghavifekr & Rosdy, 2015).

### **Learning Outcomes of Craft Skills Course**

Guidelines for the preparation of higher education curricula and assessment of student learning outcomes by the Decree of the Minister of National Education of the Republic of Indonesia No. 232/U/2000 are grouped in the core and institutional curriculum. A core curriculum is a group of study materials and lessons that must be included in a study program formulated in a nationally applicable curriculum. The core curriculum consists of a group of personality development courses, a group of courses that characterize educational goals in the form of characterizing knowledge and skills, work skills, and behavioral attitudes in work and ways of living in society, as the minimum requirements that must be achieved by students in completing a study program. An institutional curriculum is several study materials and lessons that are part of the higher education curriculum, consisting of additional and scientific groups in the core curriculum which are prepared by taking into account the circumstances and needs of the environment as well as the characteristics of the university concerned. The core curriculum for undergraduate and diploma programs consists of: (1) group of personality development courses; (2) scientific and skill subject groups; (3) group of work skills courses; (4) group of work behavior courses; and (5) community life course groups.

Higher Education Curriculum Education must not forget the Decree of the Minister of National Education of the Republic of Indonesia no. 232/U/2000, December 20, 2000, concerning Guidelines for the Preparation of Higher Education Curriculum and Assessment of Student Learning Outcomes, which consists of:

1. Personality development course group is a collection of study materials and lessons to improve Indonesian people who are pious and pious to God Almighty and have a noble character, have a strong and impartial personality, and have social experience and responsibility for the whole country.
2. The group of scientific and skill courses is a collection of lessons and lessons that are usually aimed at offering ideas for mastering certain understandings and competencies.
3. The group of creative skills courses is a collection of subject matter and classes that aim to equip specialists with painting, especially based entirely on the main understanding and competencies mastered.

4. The group of work behavior courses is a collection of materials and classes that aim to shape the attitudes and behavior that a person wants towards painting by the breadth of information, especially based entirely on the main understanding and competencies mastered.
5. Community life course group is a collection of looking at the substance and the desired class to understand the guidelines for social life by the selection of information in the workplace.

The study load for the undergraduate program is a minimum of 144 credits and a maximum of 160 credits which can be scheduled for 8 semesters and can be completed in less than 8 to 14 semesters after secondary education.

The Higher Education Curriculum is an institutional mandate that needs to be continuously updated by the desire for improvement and generation and technological knowledge as referred to in the Learning Outcomes. Universities as producers of knowledgeable human resources want to educate their graduates, on whether the graduates produced have the same 'ability' as learning outcomes that have been formulated at the IQF qualification level.

To foster compatibility education graduates between better school graduates and the business world as well as unexpected changes, in 2020 the Ministry of Education and Culture added a new scope in the field of better schools through the "Free Learning - Independent Campus (MBKM)" software. The scope of the MBKM provides students with the possibility to gain a wider range of benefits from discovering new reports and talents through a lot of outdoor learning in viewing their software, with the hope that within them they will be able to produce graduates who are equipped to win the increasingly complex and demanding life situations. in this 21st century (Krishnapatri, 2021; (Purwanti, 2021). Therefore, all universities at the academic higher education level make curriculum adjustments and improve the quality of the learning process through the SN-Dikti and MBKM programs.

### **E-Learning-Based Learning Collaborative Development Model.**

According to Richey, the design of the model in this study should emphasize the design and development of the research itself (Rita C. Richey; James D. Klein, 2009). This definition emphasizes that studies related to the model should be clearer in comparison with the current model. In the design of knowledge acquisition systems, the model generally describes the stages or processes to be taken to create effective, efficient, and enjoyable learning activities (Mota et al., 2014). So the model in learning development is a scientific process in the design, construction, utilization, management, and evaluation of learning systems

A relationship is formed in the model between technological and pedagogical competence, where technological competence affects pedagogical competence, which is based on the basic model of defined competence (Agustini et al., 2019; Susanto et al., 2019).

The model is designed to help foster student awareness and creativity, and encourage the development of discipline or responsible participation in a group. Some models stimulate inductive reasoning or theory building; and others provide for mastery of the subject matter (Klauer & Phye, 2008; Wardani et al., 2020). Bruce Joyce and Marsha Weil (2011) mention 4 (four) groups of learning models, namely: (1) social interaction models; (2) information processing models; (3) the personal-humanistic model; and (4) behavior modification models. With this learning model, we can achieve most of the school's goals and objectives. The learning model was created to help students obtain information, ideas, skills, values, ways of thinking, and ways to express themselves, and how to learn so that students can learn more easily and effectively (Loyd & Koenig, 2008). Every learning model has a reason why a model was created. The selected model is carried out, after being refined through trials in class, so that it can be used comfortably and efficiently, through theoretical studies and field practice (Milrad, 1998b).

E-learning is a learning process that uses digital circuits (LAN, WAN, or net) to deliver learning from content, interaction, and tutoring. Some interpret e-learning as a form of distance education conducted over the internet. E-learning learning emphasizes the use of internet technology to provide several answers that increase understanding and ability. The point is to emphasize the use of the internet in schools because the essence of e-learning is getting knowledge that is used for all technologies that support acquiring knowledge about efforts through internet electronic technology.

The learning model developed emphasizes resources-especially based on the total knowledge acquired, which is also referred to as learner-focused learning (Lin et al., 2017). With this model, students can get teaching materials from their respective places (through a personal computer system). The advantage of improving this model is that students' independence levels are higher and their conversational generation abilities show encouraging progress. With this model, conversations between students and education staff take place simultaneously or privately through computer support.

The criteria for e-learning, are (1) networking, to be able to quickly improve, store or retrieve, distribute, and the percentage of acquiring knowledge and information. Requirements are very important in e-learning to gain knowledge and state the absolute requirements; (2) get the knowledge sent to the customer through the computer system using a wide net generation. CD ROMs, Web TV, Web Cell Phones, pagers, and other virtual personal aids, although they can be put together to check messages, cannot be categorized as e-learning; and (3) get the broadest view of specialized learning to acquire and acquire knowledge about answers that outperform the conventional paradigm in training (Grigoraş et al., 2014; Sarsa & Soler, 2012).

Collaborative learning gains knowledge about enabling in several added values, respectively for students and lecturers, including; (1) students have the pleasure of participating, no longer only with their classmates but with other students, they did not know before, (2) gain knowledge, interactions among students that they understand to grow to be targeted because they observe this system intentionally through the lecturer's way, (3) generate motivation and enthusiasm in an extraordinary experience for

students, (4) get quite a lot of source knowledge from lecturers other than the lecturers they have known so far (Scager et al., 2016; Brindley et al., 2009 ). In addition to these advantages, of course, there are many other advantages, both direct and indirect.

Collaboration skills are one of the 4 21st century skills formulated by UNESCO, known as the 4Cs, which include; critical thinking, communication, creativity, and collaboration. Still, according to the UNESCO portal, collaborative learning is a relationship among learners that fosters positive interdependence, individual accountability, and interpersonal skills (Erdoğan, 2019; Joynes et al., 2019). So collaborative learning is a relationship between students that fosters a positive attitude of interdependence, shows an attitude of responsibility for each individual, and interpersonal communication skills. Collaborative learning is a process in which students at various levels of ability (performance) work together in small groups towards a common goal (Le et al., 2018; Baskoro, 2016; Ardi, 2008). It is a learner-centered approach to learning that draws from social learning theory as well as a socio-constructivist perspective on learning.

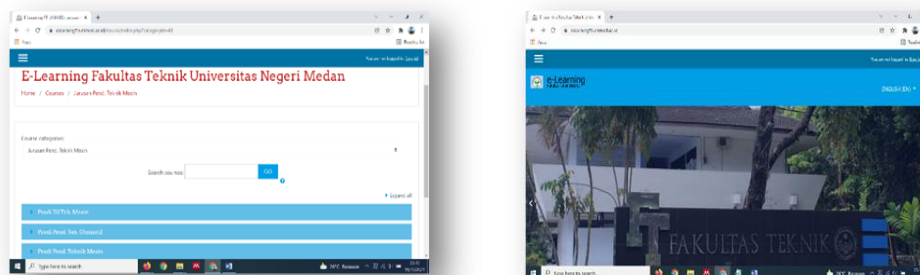


Figure 1

SIPDA (Online Learning System) E-Learning Faculty of Engineering, State University of Medan (<https://elearningft.unimed.ac.id/>)

In the field of education, the development of internet technology affects many things, one of which is the birth of the concept of e-learning. Dhawan (2020) states that e-learning will have an impact on the transformation of conventional education into digital form, both in terms of content and system. Currently, e-learning has been widely implemented in various institutions, both educational and industrial institutions. Its application is dominated by an approach called Virtual Learning Environment (VLE). This approach is applied using software in the form of a Learning Management System (LMS) such as Moodle, Claroline, and others. As an illustration, Moodle as the most successful LMS today has been integrated around 40 thousand registered sites from 196 countries (Kumar, 2018).

This website provides various facilities for students and lecturers to share learning content and carry out various lecture activities. Lecture activities such as; Lecture

materials, discussions, quizzes, exams, individual and group assignments, and other forms can be done on this e-learning media.

The subject of work skills in learning outcomes for each study program at the Faculty of Engineering has provided all learning services through SIBDA. So that the learning system can be carried out offline and online, the use of online facilities is carried out with SIBDA. Through SIBDA students can make good use of learning services.

The problem of this research is how to develop a collaborative development model based on e-learning on the learning outcomes of craft skills courses and whether the e-learning-based collaboration development model on learning outcomes for craft skills courses is appropriate/suitable for use.

## **METHOD**

This study uses a research and development approach (Research and development). Educational research and development according to Borg & Gall (1983), is a process used to develop and validate educational products, including procedures and processes, such as learning methods or learning management methods. Educational research and development include several stages in which a product is developed, tested, and revised according to field results. Learning strategy planning in model development uses the design of Dick & Carey (1985; 1996; 2005) concerning ten stages of development. To determine the effectiveness of the learning model developed, a quasi-experimental research approach was carried out with a post-test-only control group design.

The research was conducted in the Study Programs: Mechanical Engineering Education, Automotive Engineering Education, Building Engineering Education, Clothing Design Education, Catering Education, and Electrical Engineering Education on the subject of crafting skills.

The research subjects are students who take Craft Skills courses in Study Programs: Mechanical Engineering Education, Automotive Engineering Education, Building Engineering Education, Clothing Design Education, Catering Education, and Electrical Engineering Education. The research targets include students and lecturers who support work skills courses. In this research and development, by paying attention to the place, supporting facilities and infrastructure, and the learning process.

Data collection in research and development is grouped into three, namely preliminary studies, development, and validation tests. In each stage of the research, certain data collection techniques were selected according to their respective objectives. In the preliminary study, the questionnaire/questionnaire, observation, and documentation techniques were chosen, in addition to the literature review. In general, the three techniques are used simultaneously and complement each other.

Analysis of quantitative data in this study used descriptive statistics, in the form of statements less, sufficient, good, and very good which were converted into quantitative data with a scale of 4, namely scoring 1 to 4. The process of data analysis included: (1) collecting raw data, (2) scoring, and (3) the score obtained is then converted into a value with a scale of 4 using the conversion reference in Table 1 below.

Table 1  
The percentage scale according to Arikunto (1996, p.244)

Percentage of Achievement	Value Scale	Interpretation
90 – 100%	3,6 - 4	Very Good
75 – 85 %	3 – 3,5	Good
50 – 65 %	2 – 2,9	Enough
0 – 49 %	1 – 1, 9	Less

Based on the conversion of scores to values, an index score will be obtained from the analysis of the product value of the learning model developed.

### **FINDINGS**

#### Analysis of E-Learning-Based Collaborative Development Model on Learning Outcomes of Craft Skills Courses

In SN-Dikti it is stated that one of the characteristics of learning is Student-Centered Learning (SCL). SCL is intended to mean that graduate learning outcomes are achieved through a learning process that prioritizes the development of creativity, capacity, personality, student needs, and developing independence in seeking and finding knowledge. SCL develops based on constructivism learning theory which emphasizes that learners are required to construct their knowledge to learn effectively (Emaliana, 2017; Wahyudi & Winanto, 2018), namely: (1) encouraging active learning and peer involvement, as well as shifting learning power/power from lecturer to student; (2) placing lecturers as facilitators and contributors; (3) foster critical thinking that is used as a tool to develop knowledge; (4) assigning learning responsibilities to students, so that they can find their strengths and weaknesses, and direct the construction of their knowledge; and (5) use assessments that motivate learning, and inform or provide practical guidance for the future.

The form and method of learning are chosen according to the characteristics of the course to achieve certain abilities specified in the course in a series of fulfilling learning outcomes. Examples of the selection of forms, methods, and learning assignments are in table 2.



Table 2

The form, method, and assignment of learning are selected according to the characteristics of the course

No	Form of Learning	Learning Method	Assignment	Mean	Std. Deviation	Percentage	Interpretation
1	Learning Process Activities	<ul style="list-style-type: none"> <li>▪ Presentation of students in class</li> <li>▪ Group discussion</li> <li>▪ Debate</li> </ul>	Tasks Problem solving, Information seeking tasks, Reasoning tasks, opinions, Routine tasks (Group presentations)	3.65	0.48	91.25	Very Good
2	Structured Assignment Activities	<ul style="list-style-type: none"> <li>▪ Project-based Learning</li> <li>▪ Case-based learning</li> <li>▪ Collaborative learning</li> </ul>	Create projects, and discuss certain cases that are done collaboratively.	2.70	0.46	67.50	Enough
3	Activities independent	<ul style="list-style-type: none"> <li>▪ Literature review</li> <li>▪ Summarizing</li> </ul>	Make a portfolio of independent activities, Idea engineering, Critical Books Review, and Critical Journal Review.	3.25	0.44	81.25	Good
4	Practicum/ Workshop	Workgroups and discussions	Carry out activities and report on the results of practicum and project work	2.20	0.41	55.00	Enough

### Blended Learning Analysis

In blended learning, students not only get a learning experience when accompanied by a lecturer in class or outside the classroom but also get a wider learning experience independently. When studying in class with lecturers, students get learning materials and learning experiences (orientation, exercises, and feedback), good practices, examples, and direct motivation from the lecturer. Meanwhile, when studying online, students will be able to control their own learning time, can study anywhere, anytime, and are not tied to the teaching method of the lecturer. Students can study independently or interact with both lecturers and fellow students and have access to various online learning resources that can be obtained easily using devices and applications that are in their hands. The variety of learning objects is richer, in the form of electronic books or electronic articles, simulations, animations, augmented reality (AR), virtual reality (VR), learning videos, or other multimedia that can be accessed online.

Carner (2012), provides a clear definition of the proportion of online learning in blended learning, as shown in Table 3. Mixed learning can involve as much as 30-79% of the

proportion of online learning. However, substantially the delivery of learning materials and processes, including assessments, is dominantly carried out online. The mode of implementation of face-to-face and online learning is carried out in an integrated and systematic manner oriented to learning outcomes. The use of web pages only to place lesson plans, learning materials, and other learning instruments are not considered mixed learning but can be called web-facilitated learning. In contrast to online single learning, the structured and systematic learning process is carried out entirely online. The following are the limitations of blended learning and not blended learning in table 3.

Table 3  
Learning Limitations of blended learning and not blended learning

Proportion Learning online	Shapes learning	Description
0%	Face-to-face	Lectures without using online technology. Learning materials are delivered in writing or orally
1% - 29%	Facilitated network	Lectures are carried out based on network technology, especially things that are considered important in addition to strengthening face-to-face learning facilitation. For example using a webpage to place lesson plans, learning materials, and assignments
30% - 79%	Blended Learning	Learning is carried out in a mixed manner, both online and face-to-face. Substantially the proportion of delivery of learning materials and learning processes, including assessments is carried out online. Generally, the implementation of online and face-to-face learning is systematically integrated and oriented toward learning outcomes.
>= 80%	Fully Online	Learning almost completely or completely online, no more structured face-to-face meetings. All materials and learning processes are carried out online.

Source: <https://wp.nyu.edu/> Allen et al. (2007). Blending in the Extent and Promise of Blended Education in the United States.

### Learning Strategies and E-Learning Learning Settings

Learning strategies that are carried out in the learning process in the study program at the Faculty of Engineering UNIMED, are carried out through direct synchronous learning settings, virtual synchronous, independent asynchronous, and asynchronous collaborations. The determination of the learning strategies used for the craft skills course varies according to student learning conditions, settings, learning objectives, and student learning characteristics. During the pandemic, it depends on the ability of students and lecturers to use e-learning and blended learning in the learning process that will be carried out. Learning goals and objectives as learning achievement targets must be carried out properly through various learning approaches that are applied.

All student learning activities will be facilitated through various online and offline learning activities with various mutually agreed terms and conditions. An explanation of Garrett (2008) classifies various categories of student-centered learning and lecturers. The following are the stages of the e-learning-based collaboration development model for the learning outcomes of the crafting skills subject in table 4.

Table 4  
Development phase and stages of e-learning-based collaborative development model on learning outcomes of craft skills courses

Phase Development	Stages, steps, and characteristics of Model Development
Analysis	<p>Model Development Needs Analysis:</p> <ol style="list-style-type: none"> <li>1. Literature Study, Literature, Preliminary Study</li> <li>2. Field Study and Cross Check Data</li> <li>3. Study of Learning Outcomes and Subject Learning Outcomes</li> <li>4. Study the Craft Skills Course curriculum</li> <li>5. Analysis of product needs by students and lecturers</li> </ol>
Design	<p>Learning Design Model Development:</p> <ol style="list-style-type: none"> <li>1. Identifying the Profile and Learning Outcomes of the Course</li> <li>2. Analyze and determine Learning Outcomes</li> <li>3. Identify the initial characteristics of students</li> <li>4. Develop and select learning materials</li> <li>5. Develop collaborative learning strategies</li> <li>6. Develop learning resources and learning tools</li> <li>7. Carry out 6 main tasks: routine tasks, critical books review, critical journal review, idea engineering, mini-research, and project</li> <li>8. Designing and conducting formative tests, summative tests, midterm exams, semester-end exams</li> </ol> <p>E-Learning Based Collaborative Learning Strategy:</p> <ol style="list-style-type: none"> <li>1. Practice applying concepts and principles to solve problems collaboratively and cooperatively</li> <li>2. Cooperating with students and groups in fostering a positive attitude of interdependence, demonstrating an attitude of responsibility, and interpersonal communication skills</li> <li>3. Carry out the observation process before trying or applying through demonstration</li> <li>4. Develop critical thinking skills, and explore concepts or principles through discussion in problem-solving</li> <li>5. Performing presentations offline and online synchronously and asynchronously</li> <li>6. Reviewing, repeating, imitating, applying, and practicing in drills, practices, games, and simulations.</li> <li>7. Conducting special guidance in certain matters in a synchronous or an asynchronous tutorial manner</li> <li>8. E-learning-based collaborative learning process evaluation</li> </ol> <p>Product Development - e-books, learning strategies, blended learning            Product validation - e-books, learning strategies, blended learning            Product Revision - e-books, learning strategies, blended learning</p>
Development	<ul style="list-style-type: none"> <li>• Expert Validation; Subject matter content, Instructional Design, Graphic Design, and Learning Media - Analysis – Revised</li> <li>• Individual trials with different student characteristics - Analysis – Revised</li> <li>• Small group trial – Analysis – Revised</li> <li>• Main trial – Analysis – Revision</li> </ul> <p>The results of expert validation and testing are used to improve the product, then repeated trials and improvements are carried out until obtaining results that are feasible, practical, and effective, and truly meet user needs.</p>
Implementation	<ul style="list-style-type: none"> <li>• Measurement of the achievement of product development goals</li> <li>• Effectiveness of developed products</li> <li>• Packaging, diffusion, adoption, and product innovation so that it can be used by users</li> <li>• Response of target users of the product</li> </ul>
Evaluation	Feasibility of learning model products; The practicality of the learning model product; and Effectiveness of learning model products

Table 5  
Assessment aspects of e-learning-based collaborative learning strategies

No	Aspects of ICT assessment in Learning Craft Skills Course	Mean	Std. Deviation	Percentage	Interpretation
1	Positive interdependence with blended learning	3.73	0.45	93,25	Very Good
2	Understanding the mastery of lecture material in the blended learning process	3.28	0.45	82,00	Good
3	Direct interaction in blended learning	3.73	0.45	93,25	Very Good
4	the effectiveness of the learning process individually and in groups	3.28	0.78	82,00	Good
5	Responsible for individual and group learning in collaboration skills	3.63	0.49	90,75	Very Good
6	Restructuring student ideas with blended groups	2.80	0.41	70,00	Enough
7	Implementation of tasks individually, in groups, between groups, and evaluation of task results	3.70	0.46	92.50	Very Good
8	Evaluating the ability of students and student groups in blended learning	2.45	0.50	61,25	Enough

Analysis of the integration of ICT into the learning process in Higher Education UNIMED has three main objectives including (1) to build "knowledge-based society habits" such as the ability to solve problems (problem-solving), communication skills, the ability to find, obtain/manage information, change it become new knowledge and communicate it to others; (2) to develop skills in using ICT (ICT literacy); and (3) to improve the effectiveness and efficiency of the learning process. The following are student responses to the Principles of ICT Integration in learning craft skills courses in table 6.

Table 6  
Student responses to the principles of ICT integration in learning craft skills courses

No	Principle of ICT Integration in Learning Craft Skills Course	Mean	Std. Deviation	Percentage	Interpretation
1	The e-learning-based collaborative development model activates the learning process and is interesting and meaningful in the implementation of learning	3.63	0.49	90,75	Very Good
2	The e-learning-based collaboration development model constructs thinking skills, with the development of creative ideas in meaningful knowledge	3.55	0.50	88,75	Good
3	The e-learning-based collaboration development model develops abilities in a group or community that work together, share ideas, suggestions, or experiences, advise and provide input for fellow members	3.48	0.51	87,00	Good
4	The e-learning-based collaborative development model is carried out actively and enthusiastically trying to achieve the desired learning goals.	3.65	0.53	91,25	Very Good
5	The e-learning-based collaborative development model in the learning process is inherently a social and dialogical process by taking advantage of the communication process inside and outside the campus.	3.40	0.49	85.00	Good
6	The collaborative development model based on e-learning in learning situations is directed at a meaningful learning process and contextualization through a "problem-based or case-based learning" approach.	3.35	0.53	83,75	Good
7	The e-learning-based collaborative development model is carried out reflectively and is aware of what he has learned and reflects on what he has learned as part of the learning process itself.	3.43	0.50	85,75	Good
8	The e-learning-based collaboration development model in receiving learning can be delivered for various learning modalities (multisensory), audio, visual, and kinesthetic.	3.60	0.49	90.00	Very Good
9	The e-learning-based collaboration development model trains higher-order thinking skills (such as problem-solving, decision making, etc.) and indirectly improves ICT & media literacy skills.	3.71	0.45	92,75	Very Good

## DISCUSSION

The findings in this first stage are: (1) an e-learning-based collaboration development model in learning work skills courses that are suitable and appropriate to facilitate student learning, (2) find competencies that graduates must possess according to the job market, (3) find competency materials in learning craft skills courses, (4) finding e-learning-based collaborative learning strategies for crafting skills courses, (5) developing e-learning-based learning modules and media for crafting skills courses, (6)

finding learning management patterns which supports the improvement of student competence (Astutik et al., 2020; Sudjimat et al., 2020).

Based on the model, the form and learning method are selected according to the characteristics of the course in the subject of creative skills through learning process activities carried out by student presentations in class, group discussions, and debates, and students must report or collect problem-solving tasks, information-seeking tasks, reasoning tasks. agreed, routine tasks (group presentations) were carried out very well, which was 91.25%.

Based on the evaluation aspects of the collaborative learning strategy based on E-Learning, the process of learning craft skills courses is very good, including (1) Positive interdependence with blended learning of 93.25%; (2) Direct interaction in blended learning is 93.25%; (3) Accountability for individual and group learning in collaboration skills is 90.75%; (4) The implementation of tasks individually, in groups, between groups and the evaluation of task results is 92.5%.

Based on student responses to the Principles of ICT Integration in learning in the learning of craft skills courses, they are very good, including: (1) The e-learning-based collaboration development model activates the learning process and is interesting and meaningful in the implementation of learning by 90.75%; (2) The e-learning-based collaboration development model is carried out actively and enthusiastically trying to achieve the desired learning goals of 91.25%; (3) The e-learning-based collaboration development model in receiving learning can be delivered for various learning modalities (multisensory), both audio, visual, and kinesthetic by 90%., and (4) The e-learning-based collaboration development model trains higher-level thinking skills. (such as problem-solving, decision making, etc.) and indirectly also increase ICT & media literacy skills by 92.75%.

To find out the quality of learning by using an e-learning-based collaboration development model in learning craft skills subjects, an e-learning-based collaboration development model was implemented. The purpose of using an e-learning-based collaborative development model in learning work skills courses in education is to improve the quality of learning and develop student character, competencies, and learning materials. In addition to the collaborative development model, of course, improving student learning outcomes in courses is very helpful in achieving the quality of science and knowledge in their fields, solving engineering problems, developing technical interests and talents, and applying technology in the 21st century as well as increasing creative thinking skills through the implementation of PjBL strategies in a holistic manner. effective (Mursid et al., 2022)

The collaborative development model based on e-learning in learning work skills courses synergistically and collaboratively can produce maximum competence in learning, so that it is expected to have an impact on the formation of the character of the nation's students who are of good quality and according to opinion (Le et al., 2018; Pahrudin et al., 2016). This research and development will also increase students' abilities in creative skills, so that they have strong provisions and can build, can work

together, and support each other in the context of increasing scientific knowledge and improving the quality of human resources, especially Indonesian human resources with character and ability. take part and show their ability and independence in working on the knowledge they already have (Abidah et al., 2020). The role of teachers in research (Mursid, 2018) shows that teachers continue to develop effective capacity, motivation, coordination, enthusiasm, commitment, partnership strong relationship with industry, quality improvement, learning effectiveness, and ability to evaluate, monitor, and improve learning competencies according to their scientific fields to improve the quality of student achievement.

This e-learning-based collaborative development model in learning craft skills is very much needed to educate students' character (character building) and the image of higher education institutions that are managed (Bahri et al., 2020; Sudjimat et al., 2020). Therefore, the future curriculum in learning strategies can use the developed learning model to be able to: (1) equip students so that they can be used to create their work or are competent in the field of learning work skills courses, (2) develop student discipline, (3) create character building, (5) making it easier for students to get jobs, (4) creating graduates who are produced by educational standards and standards for the needs of the world of work, and (5) improving and creating excellence, as well as provision for adapting to the development of science and technology.

E-learning-based collaborative learning strategies in learning craft skills are very important to help lecturers and students create, organize, and organize learning to allow learning events to occur to achieve learning goals. The e-learning-based collaborative development model in learning craft skills is very much needed to guide the learning process effectively which has a theoretical foundation that is humanistic, flexible, adaptive, contemporary-oriented, has a simple learning syntax, is easy to do, can achieve goals and learning outcomes that are easy to achieve. based on ability in higher order thinking (Amtu et al., 2020; Farikah & Yuwono, 2018). Meanwhile, a good learning strategy must go through the evaluation stage. Evaluation is carried out in several ways, including; Formative and Summative Tests, PAN/PAP Approaches, Affective, Cognitive, and Psychomotor Approaches, Routine Tasks, Critical books review, Critical journal review, Mini research, Idea engineering, Project, and Portfolio.

The stages of developing collaboration based on e-learning in learning work skills are carried out by referring to learning: Active learning, Constructive, Collaborative, Intentional/Enthusiastic, Conversational/Dialogical, Contextualized, Reflective, Multisensory, High order thinking skill training. While the outputs produced in the implementation of ICT learning in HOTS-based education are: Real products based on the results of investigations in learning; Innovative, creative, and productive; Responsible and character; Work and do work with good results; Learning outcomes mastery of cognitive, affective, and psychomotoric aspects; and Have skills (Hariadi et al., 2022).

The e-learning-based collaboration development model in learning craft skills courses that are developed can improve student competencies, so that researchers who want further model development can use several stages of the method to be used or vice versa

by making changes and overhauling the e-learning-based collaboration model in learning of different creative skills courses for aspects of research and development with different characteristics and scopes. Can be used as a new orientation in education and collaborative learning based on e-learning in the learning of work skills courses that make educational institutions a life skills institution, with an education that aims to achieve competence, with an e-learning-based collaborative learning process in learning authentic craft skills courses and contextual that can produce valuable products that are meaningful to students.

The collaboration model based on e-learning in the learning of craft skills courses that were developed leads to the formation of a foundation that is fundamental, strong, and more focused (Yustina et al., 2022). So it is hoped that the lectures have been designed. The design of the e-learning-based collaborative learning model in the learning of the developed craft skills is very much needed to educate students' character (character building) and the image of the educational institution that is managed. Therefore, future curricula in learning strategies can use ICT learning models in e-learning-based education (Ali & Maksum, 2020; Mohammed Nasser Hassan Ja'ashan, 2020), which are developed and can: (1) equip students for accepted learning by students can be focused and can be used to create jobs, (2) develop student discipline, (3) create character building, (5) make it easier for students to get jobs, (4) create graduates who are produced according to standards, and (5) improve and create excellence, as well as provision to adapt to the development of science and technology.

## **CONCLUSIONS**

The collaborative development model based on e-learning on the learning outcomes of work skills courses is conceptually based on an overall learning approach that can be applied to facilitate, grow, and develop learning awareness, to be able to exercise thoughts, feelings, and bodies in solving life problems in the world. real.

The collaborative development model based on e-learning in the learning of work skills courses is appropriate to be used in the learning process and can accommodate objectives based on a constructivist paradigm that is by the nature of populist humanist learning and has skills in; ICT and media literacy skills), Critical thinking skills, Problem-solving skills, Effective communication skills, and Collaborative skills.

The collaborative development model based on e-learning in learning work skills courses in the learning process can provide appropriate and suitable benefits so that it can increase student understanding through the use of various ICT-based learning resources, and its application directly through SIBDA UNIMED based on e-learning.

The collaborative development model based on e-learning in the learning of work skills subjects is in the aspect of evaluating collaborative learning strategies that are carried out by positive interdependence in blended learning, and direct interaction. Through individual and group learning in collaboration skills.

The e-learning-based collaborative development model activates the learning process and is interesting and meaningful in the implementation of learning, carried out actively



and enthusiastically trying to achieve the desired learning goals, delivered for various learning modalities (multisensory), both audio, visual, and kinesthetic to train thinking skills high level (such as problem-solving, decision making, etc.) and indirectly also improve ICT & media literacy skills.

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