

Development of Information and Communication Technology-Based Hybrid Learning in Group Dynamics Courses with Collaborative Problem Solving Models

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Abstract—The research objective is to develop a hybrid learning group dynamics subject with a Collaborative Problem Solving (CPS) model. The development step refers to the development formula proposed by Borg & Gall which is modified into potential and problem analysis, product development, product testing, product revision, product validation, and final product. The results of the study were in the form of three products, namely: (1) eight video lessons on group dynamics courses; (2) CPS syntax is phase 1 focusing attention, phase 2 project development, phase 3 imitation modification, phase 4 problem analysis, phase 5 problem solving, phase 6 report review, and phase 7 team assessment; and (3) one video implementation of hybrid learning in group dynamics courses with the CPS model.

Keywords—*hybrid learning, collaborative problem solving, group dynamics, information and communication technology*

I. INTRODUCTION

The importance of understanding concepts in the teaching and learning process in the classroom greatly influences attitudes, decisions, and ways of solving problems. But in reality, it is still found that students only memorize concepts, so they are less able to use these concepts if they encounter problems in real life related to concepts, even less able to determine problems and formulate them. Some students are still unable to connect what they learn with how this knowledge will be used or applied to new situations.

This is confirmed by Arends [1] which states that in teaching teachers always require students to learn and rarely provide lessons about how students learn. Teachers also require students to solve problems. Meanwhile, research results from the Indonesia Career Center Network [2] show that as many as 87% of Indonesian students admit that the majors, they are taking in lectures so far are not following the most desired majors. The error rate percentage of students' choice of majors in their tertiary institutions is very large.

Some of the causes include: (1) lack of information about the majors to be selected; (2) most of them chose it because of their close friendship; (3) pressure from parents; (4) high grade for the major choice without adjusting the quality of achievement and real ability; (5) their low understanding of the characteristics of the chosen majors, especially related to work needs; and (6) the view that majors are not too important, the important thing is to go to college; and others [3]. Temporary search results of students majoring in Educational

Administration in recent years found that such conditions have an impact on several things, including low enthusiasm for learning, weak achievement motivation, learning effectiveness is not in line with expectations, and learning is considered an unpleasant activity, more than that is, lectures are considered an activity that cannot guarantee the world of work.

This situation, not only interferes with student learning activities but also has an impact on the emergence of problems in learning in lecture classes. Of course, the next impact is that the campus will only produce graduates who are not qualified, completely responsible, and will contribute to the creation of newly unemployed people. Data for 2018 Kemenristekdikti shows that of the approximately 7 million unemployed in Indonesia, 8.8% of them are undergraduate unemployed [4]. The two main causes are the mismatch of major choice and low competitiveness skills based on erratic world development trends, which Engelmann & Schwabe [5] call the non-predicted era.

The suitability of the choice of majors for students is very important because these choices are closely related to their abilities and talents. The right choice is to strengthen students in realizing or channeling their passion for learning and significantly impacting the maximum quality of student achievement [6]. The passion which is based on students' interests, talents, and abilities and is approached with learning facilitation that enables students to reconstruct learning, will be able to produce graduates who can adapt and even innovate in their learning life and daily life, so that they can live in their world to the fullest [5].

Therefore, in lectures, it is necessary to study how to find the best way to convey the various concepts taught so that students can use and remember these concepts longer. How lecturers can communicate well with their students. How lecturers can open diverse thinking insights from all students so they can learn various concepts and ways to relate them in real life. How as a good and wise lecturer able to use learning methods by solving problems. Teaching based on problems will be more effective if students cooperate. Students will find it easier to find and understand difficult concepts if they discuss with their friends to help each other solve complex problems.

So, it is hoped that through a collaborative model, lecturers can help students learn to work as part of a team and develop

skills and improve the quality of teamwork which is very important for the ability to collaborate when they enter the world of work. The strategy that can be taken is that the class is divided into several teams and each team is assigned to do simple research which is then evaluated and discussed again in the class. The problem-based learning approach and the collaborative learning approach are learning guides for creating a collaborative learning environment but not comprehensive. This means that cooperative learning is not understood in the context of a problem-based learning environment and problem-based learning does not always require cooperation. So that a more comprehensive approach is needed by adapting and integrating the best strategies of the two approaches into a Collaborative Problem Solving (CPS) approach.

Learning models have a broader meaning than learning strategies, methods, or procedures. Because the learning model is a frame for several learning approaches, learning strategies, learning methods, learning media, learning techniques, and learning tactics. When using the CPS approach model, some requirements should be considered with procedural tasks [7]. CPS is expected to increase understanding of lecture material, especially in the Group Dynamics subject in the Department of Educational Administration, Faculty of Education, Universitas Negeri Malang, because there are still students who do not understand the concept of this subject, so they think that the Group Dynamics course only contains meaningless games.

The objectives of this course are: (1) understanding the basic concepts of groups and group dynamics; (2) gaining experience in performing various roles in leadership, management, and communication through various kinds of group dynamics games; and (3) understand the concepts and practices of outbound training in participatory training. The Group Dynamics course contains the following elements: (1) knowledge, mastering conceptual and practical knowledge about concepts, theories, and developments in the field of educational leadership to solve problems at the micro level using an interdisciplinary and/or multidisciplinary approach; (2) attitude, work together and have social sensitivity and concern for the community and the environment; and (3) skills, able to maintain and develop networks with mentors, colleagues, colleagues both inside and outside the institution. This course discusses the basic concepts of group dynamics, individual and group behavior and interactions, effective communication, leadership, decision making, conflict management, learning group dynamics, team building, and outbound training.

Based on this, the aim of developing this learning innovation is to develop hybrid learning dynamics courses with the CPS model. The innovation value of hybrid learning with the CPS model is a model that comprehensively adapts and integrates the best strategy of the two approach models, namely the problem-based learning approach and the collaborative learning approach so that lecture participants can solve actual life-based problems. So that the lecture participants are skilled at connecting the concepts they learn with how this knowledge will be used or applied to new situations. Various activities that focus on analysis and problem solving are carried out to increase the cognitive level of students to a high level (High Order Thinking Skill).

The hybrid learning approach is learning that is carried out with a cooperative learning system (implemented in the

classroom) which is combined with project-based learning (implemented outside the classroom). The purpose of hybrid learning is to develop students' skills and understanding [8]. Classes by applying hybrid learning are classes where learning is carried out online and offline [6]. Hybrid classes are not as flexible as online classes, but hybrid classes offer an alternative to learning that is traditionally implemented (face-to-face). Therefore, the hybrid learning process is carried out by integrating learning with a digital system, the goal is that students acquire skills and knowledge [9]. Students are the main part of this learning because lecturers only function as facilitators who provide learning materials and resources to students to support learning activities.

CPS is cooperative learning with its characteristic being the application of group learning strategies by involving students in collaboratively working together in learning to achieve learning goals [10]. The terms solving complex problems and CPS are very important skills for students in the 21st century because these skills span many educational domains [11]. A student's ability to solve problems requires an understanding of knowledge. CPS is an important component in today's developments, both in the field of economy and society based on innovation and knowledge [12]. Communication and CPS aspects are important skills needed in the 21st century and have entered various fields of life, such as education, public policy, and research.

As soon as the importance of CPS is in the future, it is included in one of the PISA criteria in the assessment. CPS is one of the programs for the assessment of international students on the PISA assessment [13]. The CPS skills of students from the results of the PISA assessment in 2015, the countries that have the highest levels are Singapore, Japan, Hong Kong, South Korea, and Canada [14]. Skills such as CPS can be assessed, and taught, in the general education system [6]. This means that these skills must be able to accept the deconstruction into subskills or elements that contribute to facilitating the design of the assessment task; to identify lower to higher competencies, to facilitate their teaching.

Empirical learning progress that can be developed from the design of theory-based tests can provide teachers with tools to design classroom activities, which can enhance student progress in 21st-century generic competencies. Traditional assessment methods may not apply to measure such skills and are innovative and require advanced approaches. Even Graesser [15] developed a conversational computer agent that has been used in a collaborative problem-solving environment. This agent-based system is designed to: (1) assess students' knowledge, skills, actions, and various other psychological states based on student actions and conversational interactions; (2) produce discourse movements that are sensitive to psychological status and problem status; and (3) propose a solution to the problem [16].

II. METHOD

The step of innovation development refers to the development formula proposed by Borg & Gall [17] which is modified into an analysis of potential and problems; product development; product test; product revision; product validation; and the final product. The research object is students of the Department of Educational Administration, Faculty of Education, Universitas Negeri Malang (UM), class 2016. The research begins with an analysis of potential and problems. Products developed to go through a trial phase in

the development formula of Borg & Gall. At this stage, a video teaching material and hybrid learning for group dynamics subjects with the CPS model will be developed for expert testing and limited trials.

The experts whose role is to validate the product are a lecturer at the Department of Educational Technology as a media and learning expert; as well as a lecturer in the Department of Educational Administration as a content expert. The development plan is prepared to make it easier for researchers to carry out development research, that is, the research stage by stage can be described in the form of a workflow. These stages start from the preliminary study to the final product development, namely in this study the video teaching materials and hybrid learning syntax for group dynamics subjects using the CPS model.

The instrument used was a questionnaire in the form of a closed and open questionnaire. Questionnaires were used to assess the feasibility of video product teaching materials and syntax of lesson plan. The video feasibility indicator concerns the content feasibility component and the video presentation component. The analysis used to determine whether the product being developed is suitable for use is descriptive analysis with a standard formula [18]. Furthermore, according to the researchers' consideration, the answer criteria were changed from standard into 4 categories, namely: poor; fair; good; and excellent. So that the criteria formula is modified as shown in Table 1.

TABLE I. MODIFICATION OF STANFIVE FORMULAS FOR PRODUCT FEASIBILITY

No	Formula	Category
1	$X < (\bar{X} - 1.5 \text{ SD})$	Poor
2	$(\bar{X} - 1.5 \text{ SD}) < X < (\bar{X} - 0.5 \text{ SD})$	Fair
3	$(\bar{X} - 0.5 \text{ SD}) < X < (\bar{X} + 1.5 \text{ SD})$	Good
4	$(\bar{X} + 1.5 \text{ SD}) < X$	Excellent

This innovative learning development product for the group dynamics course is manifested in the form of learning both in class and outside the classroom, both on-line and off-line following the provisions of lectures at UM. The output of this innovation is in the form of video teaching materials for group dynamics subject matter, hybrid learning syntax for group dynamics subjects using the CPS model, and videos on the implementation of hybrid learning for group dynamics subjects using the CPS model.

III. RESULT

A. Video Teaching Materials for Group Dynamics Subject

The first draft of the teaching material video was designed for six instructional videos. Each video is 30 minutes long consisting of game materials: communication, leadership, conflict management, team building, indoor community practices, and outdoor community practices. Four 30-minute videos were the first to be tested by experts because they were pre-made, namely communication, leadership, conflict management, and team-building games.

Meanwhile, two other video teaching materials, namely indoor community practice videos, and outdoor community practice videos are still in the production stage so they have not been tested on experts. Based on written input from experts on draft 1, the four videos were split into eight videos.

Draft 2 videos of group dynamics course material consist of eight videos which each video has a duration of 15 minutes edited based on written input from experts in draft 1, namely video game teaching materials: Baking, Guessing Fun, Impulse, Walking Ear, Pulses, Peeling, MBS, and Aladdin Glass. Furthermore, the results of the analysis of the media instrument validation questionnaire on the draft 2 videos of teaching materials from experts for 8 videos each amounting to 20 questions on a scale of 4, resulting in a minimum value of $8 \times 20 \times 1 = 160$ and a maximum value of $8 \times 20 \times 4 = 640$ and range 120. Table 2 shows all videos declared good by the first and second experts. Range 520-640 with a frequency of 2 (100%).

TABLE II. EXPERT VALIDATION FOR ALL DRAFT VIDEO TEACHING MATERIALS 2

No	Meaning	Range	Expert	
			Total	%
1	Poor	160-279	0	0
2	Fair	280-399	0	0
3	Good	400-519	0	0
4	Excellent	520-640	2	100
Total			2	100

The final product of the video teaching materials for the group dynamics course consists of eight videos that have been edited based on written input from experts on draft 2. Each video is 13 minutes long which contains: name of the game, general & specific objectives of the game, game time & reflection, number of participants, game properties, game procedures, theory reflection, and game reflection results. Table 3 describes the final video of teaching materials in detail.

TABLE III. FINAL VIDEO OF GROUP DYNAMICS TEACHING MATERIALS

No	Title	URL
1	Outdoor Communication Game: Baking Tray (Balloon Shake)	https://youtu.be/YHtM4koV6l8
2	Indoor Communication Game: Neighbors Whisper (About Words & Pictures)	https://youtu.be/yBYEsUwxODk
3	Outdoor Leadership Game: Shorty (Mbullet Train)	https://youtu.be/wS7JF27vcuE
4	Indoor Leadership Games: Ears Walk	https://youtu.be/yh2LFjmxDa8
5	Outdoor Conflict Management Games: Pulses (Puzzle, Candles, Gloves)	https://youtu.be/aMz2gNq_HxM
6	Indoor Conflict Management Game: Peel (Hot Chair)	https://youtu.be/RJtz7-MCeo
7	Outdoor Team Building Game: MBS (Moving Ball Survive)	https://youtu.be/Uif7zpkMIR4
8	Indoor Team Building Game: Aladdin's Glass	https://youtu.be/11QV1OPIRVQ

Furthermore, the eight final videos of teaching materials were tested with a questionnaire and the results of the test data analysis by 42 students were 8 videos, each with a total of 20 questions on a scale of 4, resulting in a minimum value of $8 \times 20 \times 1 = 160$ and a maximum value of $8 \times 20 \times 4 = 640$ and a range of 120. Table 4 shows that of the 42 student respondents who answered criterion 4 were 41 (97.6%), while those who answered criterion 3 were 1 (2.4%).

TABLE IV. TESTING RESULTS OF ALL FINAL VIDEOS (VIDEO 1 - VIDEO 8)

No	Meaning	Range	Frequency	%
1	Poor	160-279	0	0
2	Fair	280-399	0	0
3	Good	400-519	1	2,4
4	Excellent	520-639	41	97.6
Total			42	100

The results of the analysis of different tests on 42 students based on the sex of 9 (21.4%) men and 33 (78.6%) women about responses to video products of teaching materials with analysis of different tests using the Kolmogorov-Smirnov test; $asympt.sig. (2-tailed) = 1,000$; $df = 5\%$. The results of $asympt.sig. (2-tailed) > 5\%$, then H_0 is accepted, which means there is no difference between male and female students in assessing the video product of teaching materials. Based on the results of the trial data analysis and input that are good, the final product in the form of eight videos of teaching materials for the group dynamics course is no longer revised.

B. Syntax of Hybrid Learning in CPS Model Group Dynamics Course

The draft 1 syntax of the hybrid learning CPS model was submitted to experts. Based on written input from experts, draft 1 syntax was revised into the draft 2 syntax hybrid learning CPS model. The results of the questionnaire analysis of the learning design instrument validation on the draft 2 syntaxes from the experts are shown in Table 5.

TABLE V. EXPERT VALIDATION FOR DRAFT SYNTAX 2

No	Assessment Aspects	Score		Total
		Expert 1	Expert 2	
1	Identify the general purpose of learning	4	4	8
2	Learning analysis	4	4	8
3	Identify the behavior and characteristics of learners	4	4	8
4	Formulation of performance goals	4	4	8
5	Formulation of assessment reference criteria	4	3	7
6	Learning strategy development	4	4	8
7	Material development and selection	4	4	8
8	Design of learning materials	4	4	8
9	Development and implementation of formative evaluation	4	4	8
10	Development and implementation of summative evaluation	4	4	8
Total		40	39	79
Meaning		Well	Well	Well

Rating for each expert with 10 questions on a scale of 4, then obtained a minimum value of $1 \times 10 = 10$ and a maximum of $4 \times 10 = 40$ and a range of 7.5. Table 5 shows that from expert 1 got a score of 40 which means the learning design

was declared GOOD. And from expert 2 got a score of 39 which means the learning design is declared GOOD. While the assessment for both experts simultaneously with 10 questions with a scale of 4, then obtained a minimum value of $1 \times 10 \times 2 = 20$ and a maximum of $4 \times 10 \times 2 = 80$ and a range of 15.

Table 5 shows that the two experts simultaneously got a total score of 79, which means that the learning design of the two experts was declared good. The final product of hybrid learning syntaxes for CPS model group dynamics is finally compiled based on written input from experts in the draft 2 syntaxes. Table 6 describes the final syntax in full.

TABLE VI. FINAL SYNTAX OF THE CPS HYBRID LEARNING MODEL

Step	Student Activities	Meeting
Phase 1 <i>Focusing Attention</i>	<ul style="list-style-type: none"> Watching video outdoor group dynamics game teaching materials. Reflecting on the group dynamics game teaching material video. Draft a group dynamic game scenario according to the team theme. 	2
Phase 2 <i>Project Development</i>	<ul style="list-style-type: none"> Watching the video of indoor group dynamics game teaching material. Reflecting on the group dynamics game teaching material video. Reviewing group dynamics game scenarios according to the team theme that has been prepared previously. 	3
Phase 3 <i>Imitation Modification</i>	<ul style="list-style-type: none"> Practicing group dynamics game scenarios that have been developed according to indoor & outdoor themes. The development team becomes the facilitator of the group dynamics game according to the theme. Reflecting on the application of the theory in the game. 	4, 5, 6, 7
Phase 4 <i>Problem Analysis</i>	<ul style="list-style-type: none"> Analysis of group problems in society. Develop outbound training scenarios to solve group problem problems in the community. 	8, 9
Phase 5 <i>Problem Solving</i>	<ul style="list-style-type: none"> Practicing outbound training in the community. Become a facilitator of outbound training in the community. 	10
Phase 6 <i>Report Review</i>	<ul style="list-style-type: none"> Reporting the results of the outbound training in the classroom. Reflecting on the application of theory in the outbound training practice. 	11, 12, 13, 14
Phase 7 <i>Assessment Team</i>	<ul style="list-style-type: none"> Self-evaluation of individual contributions to the team. Discussion of self-evaluation results by all team members. 	15, 16

C. Video on the Implementation of Hybrid Learning in the CPS Model Group Dynamics Subject

The first draft of the video implementation of hybrid learning in the group dynamics subject with the CPS model with a duration of 15 minutes was submitted to the experts. Based on input from experts, the first draft of the implementation video was revised into 2 draft implementation videos with a duration of 20 minutes. The 2 draft implementation videos were then examined by reviewers from the university.

Based on the input from reviewers, the 2 draft implementation videos were revised to become the final 15 minutes implementation video product. The final product is

the video implementation of hybrid learning in group dynamics subject with the CPS model on the link <https://youtu.be/Bgs7NoWl3Y> resulting from life-based learning innovation development activities contains seven phases: Phase 1 Focusing Attention; Phase 2 Project Development; Phase 3 Imitation Modification; Phase 4 Problem Analysis; Phase 5 Problem Solving; Phase 6 Report Review; and Phase 7 Team Assessment.

IV. DISCUSSION

This research concludes that the development of hybrid learning with the CPS model in Group Dynamics subjects has been implemented well and meets good learning criteria. The main asset of a teacher in developing learning is adapting to the development of science and technology. Therefore, the ability of teachers to keep up with technological developments is very important. The learning system will be influenced by developments in science and technology. An important factor in learning activities is learning innovation. Learning innovation aims to increase the effectiveness of learning and make learning more meaningful.

The ability that the teacher needs in making learning innovations is always trying to find, explore, and look for various breakthroughs, approaches, and learning methods. Learning activities designed by today's teachers have undergone a metamorphosis leading to positive and significant developments. The development of learning models and methods is in line with the development of education, teaching, and psychology. This learning development leads from teacher-centered learning to student-centered learning [19]. Teachers in carrying out learning activities must be in line with the correct and appropriate learning strategies that are tailored to the learning objectives to be achieved.

The characteristic of hybrid learning is integrating innovation and technology through online and offline learning systems to increase student interaction and participation. Hybrid learning is learning that combines face-to-face learning and online learning [20]. This hybrid learning provides two types of choices regarding who will play the main role in learning activities, namely being led by lecturers or students. The initial stage of implementing lecturer-led learning is in the ongoing learning process, then it is immediately converted into learning led by lecturers.

The hybrid program is currently developing into several dimensions, namely: (1) face-to-face, which is implemented in the class, laboratory for practicum, and mentoring, which is used to deliver material, presentations, discussions, exams, and practice questions; (2) synchronous virtual collaboration, learning which is carried out using text messages for discussion forums, involving lecturers and students simultaneously; (3) virtual asynchronous collaboration, the facilities used during learning are online discussion forums and email, involving lecturers and students who are delivered at different times; and (4) asynchronous self-paced, which is independent learning and carried out at different times, students can study the material (modules, teaching materials, assignments, or exercises) delivered by lecturers online. In this case, students can integrate material with various sources that they can access, either from online or offline sources.

The hybrid learning model is shown to significantly improve student learning outcomes in mathematics, in the understanding of elementary school teachers about the

concept of science education [21]. Karabulut & Jahren [22] research results evaluated the Hybrid Learning model, which resulted in a hybrid model providing practical implications for development. Examined reading speed and comprehension enhancement in hybrid learning and the results showed that the experimental group and control group students managed to improve their reading speed and comprehension. It is implied that reading speed and comprehension may be increased in both web-based and face-to-face reading portals.

The application of CPS has a significant effect on the achievement of learning outcomes and creative thinking skills [21]. CPS is alternative learning, conforming to the demands of the twenty-first century. Although the virtual hybrid classroom promises flexibility in education as it gives students the choice of where to attend class, it is also the most challenging to teach and learn as distance learners [23]. It has been found that both peer-to-peer engagement and intrinsic motivation are lower in hybrid-virtual learning.

Students often work with several other students in groups. Group problem solving becomes a common and natural thing when we work in a group. Many learning approaches are then built to answer this. One of the approaches built is cooperative learning. This approach has been used for years and is a major driver in increasing collaboration in the classroom [24]. A more recent approach is problem-based learning, which is growing as a necessity for medical education, a more realistic learning experience for students [25].

The two approaches have a different focus on aspects of the collaborative learning process. Cooperative learning guides how to organize learning groups and gives suggestions for specific activities to build students' learning experiences such as the jigsaw method, think-pair-share, and student-teams achievement division. Meanwhile, problem-based learning emphasizes the construction of problem scenarios with educator assistance rather than working to solve them. This approach will be more effective if students work together with one another.

Students will find it easier to find and understand difficult concepts if they discuss each other with their friends; students routinely work in groups to help each other solve complex problems [10]. Both of these learning approaches also provide invaluable guidelines for forming a collaborative learning environment that fills each other's shortcomings. Therefore, a more comprehensive approach is needed that not only adapts and combines the best strategies of the two approaches but also provides additional guidance on how to encourage students through real and actual problem-solving. This approach is called Collaborative Problem Solving (CPS) or a collaborative problem-solving approach.

CPS applies two main principles, namely the social, emotional and behavioral challenges of children that should be understood as a byproduct of the development of cognitive abilities and secondly, collaborative problem solving should be the focus of attention in facing a challenge [26]. The values contained in this approach are: (1) creating a conditioned learning environment, centered on the learner, integrated and collaborative, contrary to the environment that is not contextually separate and competitive; (2) appreciating the importance of authenticity, ownership and relevance of learners' learning experiences in line with the content to be learned and the process by which the content is learned; (3) allowing students to learn as active participants in their

learning process; fostering the development of critical thinking and problem-solving skills, encouraging exploration and analysis of content (content) from multiple points of view; (4) recognizes the importance of social context for learning; (5) maintain mutually supportive and respectful relationships between learners and between learners and instructors; and (6) develop a lifelong desire to learn and the skills to sustain it [7].

Several conditions must be met for the implementation of the CPS approach to be effective. Things that must be considered are the type of content (content) and the learning environment, in addition to the characteristics of students and educators. Type of content (content), this approach is very suitable for heuristic rather than procedural tasks, heuristic tasks are created from a complex system of knowledge and skills that can be combined in a variety of ways to complete the task well. Another suitable type of learning is the conceptual and cognitive understanding formation strategies. The learning environment, the most effective learning environment for the CPS approach, is a conducive collaboration, experimentation, and inquiry, as well as an environment that encourages the open exchange of ideas and information.

Characteristics of learners, who use the CPS approach, are directed learners, who are familiar with, and are willing to take responsibility for their learning. Often educators will need to explore the characteristics of the learner, especially if the experience of the learner is familiar with traditional educational approaches. Characteristics of educators, educators must also be comfortable with little direct direction to students and their lessons must be willing to encourage independent learning by students and work more as facilitators than as small managers (leaders). This requires that instructors be flexible and tolerant of some degree of ambiguity in what is being studied and how this will occur.

Collaborative media learning materials can be effective but greater improvements are needed in line with suggestions from experts and users [27]. Children who worked together collaboratively received a significantly higher number of correct answers than did children who worked individually [28]. The impact of CPS students can provide an analysis of individual and group contributions to mathematical sophistication in collaborative task settings [29]. Implications of using two approaches to conceptualize the sophistication of mathematics for the future as well as educational research and teaching practice. The Group Science Learning (GSL) model is effective for enhancing collaborative problem-solving skills and the confidence of prospective elementary school teachers.

Implementation of the CPS approach requires guidelines with which to design and participate in authentic learning environments that require critical thinking, creativity, and complex problem solving along with the formation of essential social interaction skills. Life-based learning in CPS is characterized by the principles of learning: (1) establishing independence, creativity, adaptability, and agility of learners; (2) creating a learning ecology that transcends the boundaries of life, whether it is physical, psychological, or social, namely learning in community networks and their interactions with the universe; (3) learning as a natural life cycle through the stages of acquiring knowledge, expanding and refining knowledge, and applying knowledge in the reality of life; (4) learning takes place in a situation that prefers student independence; and (5) assessment of learning-oriented to life-based learning, characterized by an assessment during the

learning process to achieve the learning objectives set by prioritizing the authentic assessment and high-order thinking.

The cooperative learning model is an alternative to increase the activeness and learning outcomes of students. Learning centered on learners is an important thing to do. So that learning by itself will shift from the paradigm of students being told to find out, learn together, and also improve the social-emotional of students. The development of learning activities must continue to be pursued in educational demands that mandate the development of the potential of students.

Learning in higher education is often carried out using the expository method, where students are given lecture material directly by lecturers with lectures and assignments. The expository method is a learning method that is used by providing a prior explanation of the definitions, principles, and concepts of the material and providing examples of problem-solving exercises in the form of lectures, demonstrations, questions and answers, and assignments. Students follow the pattern set by the lecturer carefully. The use of the expository method is a learning method that leads to the delivery of material content to students directly. Using this method, students do not need to find and find facts, concepts, and principles by themselves, because they have been presented clearly by the teacher.

Learning activities using the expository method tend to be lecturer centered. Lecturers actively provide explanations or information about the course material in detail about learning material. The expository method is often analogous to the lecture method because it provides information. Any presentation of information orally can be called a lecture. The lecture method is a way of delivering lesson material with oral communication. The lecture method is more effective and efficient to convey information and understanding.

In the current decade, the cooperative learning model has become the most popular learning strategy in various forums. Cooperative learning has its magnet for learning practitioners in developing teaching activities. The cooperative learning model departs from the basic social learning theory, which assumes that learning is a change, both in learning achievement, visible behavior, and changes in the attitudes and motivation of students. The learner is a product of the social environment and active participants in it. The emphasis is on the learner's internal state such as attitudes and motivations that have an impact on learner choices. Learning occurs as a result of social interaction in formal (school, campus) and informal (family) settings.

The development of cooperative learning models is intended to increase student activity and learning outcomes. Student activeness in lectures will support the achievement of their learning outcomes. Student activeness in lectures includes all activities and or carried out by students, such as taking notes, expressing opinions, asking questions, responding to questions from other students or lecturers, or refuting other students' answers. Student learning activeness refers to the activities carried out during lectures. These activities involve activities carried out by students, both intellectually, emotionally, and physically if needed.

Indicators of student activeness in lectures can be classified into seven indicators, namely: (1) responding to the motivation given by the lecturer; (2) reading or understanding the problems contained in the student worksheet; (3) solve problems or find answers and ways to answer; (4) express an

opinion; (5) discussing or asking questions between students and lecturers; (6) present the results of group work; and (7) summarizes the material that has been discussed. The activeness of students in the learning process can stimulate and develop their talents, think critically, and can solve problems in everyday life. Also, teachers can engineer the learning system systematically, thereby stimulating the activeness of students in the learning process.

In addition to student activity in lectures, the main target of lecture activities is student learning outcomes. Learning outcomes are abilities that students have after receiving the learning process or learning experience [30]. Student learning outcomes include cognitive, affective, and psychomotor domains. The lecture assignments designed by the lecturer refer to the learning outcomes to be aimed at. Class assignments must also reflect the characteristics of the course and refer to these three domains [31]. Student learning outcomes are influenced by time and opportunity (engagement). The time and opportunity that is owned by each student are different so that it affects differences in student learning outcomes [32]. Students who give more time and opportunities to study tend to have good learning outcomes.

The level of intelligence is very much determined by time and opportunity. Students will be able to do assignments better if given sufficient time and opportunity [33]. Smarter students have the possibility of doing shorter assignments than less intelligent students so that lecturers must have the ability to teach students individually and recognize the characteristics of each student so that learning activities can run optimally. In contrast to internal factors, external factors are factors that arise outside of students. External factors that can affect learning outcomes are the learning materials received by students, learning methods used by lecturers in learning activities, teaching lecturers, learning facilities, learning environment, family socio-economic conditions, curriculum, and educational and teaching programs from campus.

Each teacher is encouraged to make plans for the subjects they are building. Planning is also made regarding ways of presenting learning, learning materials, learning media, learning strategies, learning resources, learning materials, and learning evaluation. The aspects that need to be prepared by a teacher before teaching include making annual programs, semester programs, syllabus, lesson plans, and enrichment [34]. Supervisors must pay attention to the processes and procedures of a teacher in preparing for learning. With careful planning, it is hoped that it will have a good impact on the quality of learning carried out by the teacher, which in turn can improve the learning behavior of students. Teaching effectiveness is largely determined by teacher planning. One of the supervisor's duties is to assist the teacher in planning teaching, which can be done using group conferences.

The preparation of a learning implementation plan aims to design student learning experiences to achieve learning goals. There is no specific line of thought (algorithm) for compiling a lesson plan because the design should be rich in innovations following the specifications of teaching materials and student learning environments (natural resources and local culture, community needs and developments in science and technology). To compile a quality lesson plan, the teacher must live up to the spirit of the teaching profession, live up to the characteristics of the subject and the characteristics of the students. Education in Indonesia at present revitalizes character education at every level of education [35].

Character education in educational units is not new, even character education has become one of the programs that characterize an educational institution [36]. Based on this, character education must be implemented in the process of teaching and learning activities in all subjects. Thus, any subject matter, the teacher must be able to relate to student character education. Teaching and learning processes that can link material with character education will be successful if supported by good lesson preparation planning as well.

V. CONCLUSIONS

The results of the research were: (1) eight video teaching materials for group dynamics subjects; (2) hybrid learning syntax for group dynamics subject using the CPS model; (3) and one video implementation of hybrid learning subject on group dynamics in the CPS model. The development of the lecture model needs to be carried out by both lecturers and institutions, both departments and universities, which refer to the needs and developments of information technology.

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