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Development of Hybrid Discovery Learning (HDL) Model for Integrated Social Studies Learning

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Abstract. The Covid-19 crisis has led to a widening of the scope and role of online-based learning and information technology (IT)-based education. It is believed that the IT based education will play significant roles even when the Covid crisis ended. Online based learning requires good preparation and contextual schemes to achieve learning outcomes. Students will benefit the online based teaching once it is well prepared and equipped with interactive IT. A combination off- and online learning, known as hybrid learning, when merged to discovery learning will enhance more student interaction. It can measure the interaction numerically and laterally of students. Also, students will explore real-world problems through reality learning condition. This study was developed using the ADDIE model and qualitative descriptive approach. The objective was to evaluate whether using hybrid in the discovery learning will bring barriers for teacher and whether it is effective to achieve students learning outcomes. In this study, the hybrid and discovery learning were combined onto Hybrid Discovery Learning (HDL) model. The developed model was tested with two different focus group discussions (FGD), followed by 24 teachers and instructors of the social studies, and tested for 12 classes. The results demonstrate that the HDL model is successfully support the integrated learning of social studies. However, the benefits of implementing HDL model can only be optimal when several aspects (26 aspects according to the results of the second FGD) such as powering digital means, develop good IT based teaching materials, preparation of templates, and adjust suitable evaluation system, are well done.

Keywords. online, IT, discovery learning, hybrid discovery learning

Introduction

The impact of the *Corona Virus Disease* (*Covid*-19) pandemic, which was dramatically spreading in early 2020 to 2021, is very influential to various aspects of life (Andrews *et al.*, 2020) including the field of education as described by Mork, *et al.*, (2021). The Covid-19 pandemic has strongly affected the delivery of the education at every level. Specifically, Covid-19 affects the learning and technical processes in teaching (Tîrziu & Vrabie, 2015). Learning process changed instantly from conventional to hybrid or totally distance learning by using several platforms such as Zoom Meeting, WhasApps, Google meet/class (Berry & Hughes, 2020).

Online based learning remains a future need because it is in line with the characteristics of 21st century education where integration of technology is necessary (Smaldino *et al.*, 2015). Therefore, teachers as the major person of the learning creators must have or equipped with the competences to carry out both or even triple learning system e.g., offline (face to face), online

between off- and online (hybrid learning) (Keiper, *et al.*, 2020). Hybrid learning combines face-to-face classroom instruction and online environment (Doering, 2006). Offline learning, it can be in the synchronous or asynchronous format (Hapke *et al*., 2020).

Hybrid learning, the teachers must have prerequisite skills such as hard- and software literacies. With good computer skills, teachers can conduct interactive learning that students have better experiences and can explore the learning material like a real face to face meeting, and can increase students' participation (Johnson *et al*., 2018). Social studies (known as IPS field of study in Indonesia) which is different than the natural sciences learning, is also relevant to implement the hybrid learning. However, this learning system is not introduced, only the discovery learning model is applied following the Indonesia Ministry of Education regulation/Permendikbud No. 22 of 2016. On other hand, the hybrid learning is expected to benefit the social studies student, can support student's freedom to mine learning material, intensifier interaction between leaner and teacher with integration of nowadays technology.

Discovery learning is well known to facilitate the discovery, developing of students' interest, and helping them to conduct research. Discovery learning can be carried out offline and online, the orientation of the learning is towards improving learning outcomes as an indicator of feasibility and student learning satisfaction. Discovery learning (offline and online) can be conducted by applying hybrid learning too and is considered to develop the higher-order thinking skills (HOT) such as ability to analyzing, evaluating, and creating, respectively (Anderson & Krathwohl, 2001).

Online learning is considered less impact to achieve student learning outcomes, but the hybrid in the discovery learning is potential to bring better impact on learning outcomes for students. For social studies, hybrid in the discovery learning requires extra preparations such as having great lesson plans, teaching materials, and integration of IT applications. The learning developed system and teaching material shall be investigated and validated. The hybrid for the discovery learning is not only need to be developed and validated, but whether the teaching context, the lesson plans, teaching materials, and applications of hybrid for the discovery learning are effective enough. The online and hybrid, both were instructed by the education ministry in the early of COVID-19 pandemic (Tantono *et al*., 2020)

This change requires every teacher of social studies (IPS) to be capable to conduct teaching both online and offline. The online and offline can also be combined as hybrid learning, also known as blended learning, that substantively combines two or more methods and approaches in learning process. At the same time, the social studies teachers are required to follow the learning model recommended by the Ministry of Education and Culture, namely oriented discovery learning. This study objective is to evaluate whether using hybrid in the discovery learning will bring barriers for teacher and whether is effective enough to achieve students learning outcomes.

Methods

This study is categorized as research development by applying the ADDIE model (Branch, 2009) with qualitative descriptive approach. The research was carried out in 2021, with study area in Central Sulawesi Province, Indonesia. This study aims to develop a Discovery-based Hybrid Learning model which can be adopted by social studies teachers, both as book guide based and structured as Learning Management System (LMS). The ADDIE model consists of 5 (five) stages, namely Analyze, Design, Develop, Implement, and Evaluate. The analyzing as aiming to identify the scope of the variables theoretically and the learning environment. The designing stage aims to update the plan for constructing the targeted products with the right test method. The developing stage is an actualization process from the previous stages. Implementing stage is aiming to study the products based on the results of the Focus

product and the instructional process.

Results & Discussions

Results

The analysis phase was aiming to identify variables to produce a conceptual basis for hybrid learning and discovery learning variables. This study adopts the grand theory of each keyword so that the shift and development of the learning model can be accounted for. The design stage regulates the constructing of conceptual and operational definitions of the main theory. We follow the concept of hybrid learning that introduced by Tashiro (2011), it is:

Table 1. *Classification of Hybrid Learning implementation according to Tashiro*

Learning type	**Face-to-face**	***Online Interactivity***	**Face-to-face and Online Class Components**
Type 1	Low – Little direct instruction	Low – Online learning with reading and drawing activities without simulation or interactive learning using objects.	Low–Learning material is material that is reinforced in virtual face-to-face.
Type 2	Low – Little direct instruction	Medium – Online learning activities include reading and relevant pictures and simulations or interactive learning objects.	Low–Learning material is material that is reinforced in virtual face-to-face.
Type 3	Medium – Direct instruction with several discussions and directed at using learning online activities and collecting other learning resources online.	High - Activities include reading with relevant simulations which are very interactive and reinforced with other materials and skills through virtual face-to-face.	Medium – Learning material is material that is reinforced in virtual face-to-face and extended through relevant simulations.
Type 4	High – Students are facilitated to strengthen their skills through face-to-face material and using online discussions	High - Activities include reading with relevant simulations that are very interactive and reinforced with other materials and skills through virtual face-to-face.	Medium – Learning material is material that is reinforced in virtual face-to-face and extended through relevant simulations.
Type 5	High – Students are facilitated to strengthen their skills through face-to-face material and using online discussions.	High - Activities include reading with relevant simulations that are very interactive and reinforced with other materials and skills	High – Materials and media are designed for virtual face-to-face from the beginning of learning by combining relevant simulations and objects.

type	...ne Interactivity	Face-to-face and Online Class Components
	through virtual face-to-face.	

We also adopted other syntaxes based on Martyn (2003), as following:

Table 2. *Hybrid Learning Syntax according to Martyn*

Objectives	Syntax
1. Improve final exam scores 2. Improve project 3. Quality learning quality 4. Improve content 5. Understanding technical understanding 6. Improve a sense of togetherness 7. Improve teacher and student interaction 8. Increase participation in the discussion	**Part 1**. Face-to-face learning to provide a sense of cooperation through introductions to electronic devices and introduction to theory. **Part 2**. Synchronous learning that has been scheduled to meet face-to-face. **Part 3**. Learning through asynchronous discussion by using electronic platform, with a post-response flowing. **Part 4**. Online Quiz to test the understanding of the lessons **Part 5**. The final face-to-face exam

Discovery learning is used in the hybrid learning condition on an asynchronous scheme according to Bruner (1961), namely:

Table 3. *Syntax of Discovery Learning according to Bruner*

Objectives	Syntax
Principle 1: Problem Solving Principle 2: Learning Management Principle 3: Integrate and Connect Principle 4: Analysis and Interpretation of Information. Principle 5: Failure and give feedback	1) Passing stimulation 2) Statement/problem identification (problem statement) 3) Data collection 4) Data processing 5) Proof (verification) 6) Drawing conclusions/generalizations

At the designing stage, we carried out Focus Group Discussion (FGD) attended by 24 teachers and 6 lecturers who have a good track record in social studies learning (IPS). The method used is by collaborating the essential stages of each theories mentioned above. The participants validated together the method to ensure the syntax that is built up can be implemented in social studies learning and learning environments outside the classroom too. The results of the FGD show that the development of hybrid for the discovery learning or named as Hybrid Discovery Learning (HDL) need few learning steps included several meetings to build up one lesson. The needed steps of Hybrid Discovery Learning (HDL) as follows:

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Table 4. *Syntax for the Hybrid Model Discovery Learning*

Syntax	Teacher activities	Student activities
Stimulation process	teachers give apperception or recall the students understanding/knowledge	Students take turns providing information from experiences they have seen or experienced.
Statement/Identification of problems	teachers give examples from the core of the lessons	Students listen to the explanation from the teachers.
Theory Strengthening	teachers provide an expository explanation of learning materials using media in the form of videos, graph and or images.	Students listen and digest to the explanation of the teachers.
Online learning strategy	teachers provide instructions on the stages of online learning (synchronous and asynchronous) for subsequent meetings.	Students listen and follow the instructions of the teachers.
	teachers give directions to students about the stages of the investigation, starting from data collection techniques, data processing, and drawing conclusions based on theoretical and or field phenomenon.	
	teachers divide the class onto few groups purposively based on several criteria e.g., understanding, knowledge, resident area of students etc.	
Data collection	teachers pass several worksheets to Students to find/collect data through interviews, observations, review, and literature studies.	Students collect data either through interviews, observations, and or review from different written sources in nearby and far areas.
Data processing	teachers show how to input, to process and analyze the data in comprehensive way	Students work on the collected data e.g., to entry, to process and to analyze, follow the training that guided by the teachers.

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Syntax	Teacher activities	Student activities
Verification process	Teacher verify student opinion based on the findings of the lesson topics.	Students compare the findings with their personal opinions based on the theory that has been taught by teachers, then discuss, and defense the differences.
Drawing conclusions/generalization of finding	teachers verify the students' conclusions and prepare discussion material with aims to these conclusions, either straightening, enriching, or comparing with broader phenomenon.	Students draw temporary conclusions from the studies, the findings, comparison to theories, and their personal opinions, respectively.
Discussion of the finding with synchronous scheme	Teachers prepare several digital teaching materials (proper and effective).	Students join the groups and discuss the topics that supported with different digital materials and graphs.
	Teachers give opportunities for group to present their findings.	Students as a group convey their findings and give information briefly.
	Teachers give additional questions to straighten the discussion towards the conclusion.	Students discuss, defense, and give clarification on the questions and suggestions.
Discussion of the finding with asynchronous scheme	teachers prepare digital platform to continue the discussion and explore students understanding.	Students follow and actively contribute to the discussion on the provided social media platform.
Data collection which has been supported by the discussion results	teachers develop and distribute templates to students, to be filled	Students write down the finding of the discussed topics which has been enriched through discussion, and suggestion by students and teachers.
Evaluation processing	Teachers prepare different formats (essay, multiple choices, comprehensive writing etc.) to evaluate the learning outcomes	Students work on questions under online environment.
	Teachers reflect the learning outcomes as references to improve for the coming teaching period	

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The implementation stage was, we required the teacher applying the HDL model in the classroom. We observed quite big number of classes, was 12 classes, this is to ensure the HDL is fully applied and followed by students and teachers from different aspects and timing. The last was the evaluations stage, this stage is the closing key stage for perfecting the learning model. At this last stage, we carried out another FGD with 24 teachers who did the observation of the classes. The results of the FGD identified 26 critics and suggestions for improving the learning steps for implementing the HDL model. The critics and suggestion covered the lesson plan, learning scenarios, and the utilization of platform. The major target of the suggestion is to develop the learning model not only valid under the COVID-19 pandemic but to develop a modern learning system at the same time.

Discussion

The 21st-century learning brings several consequences including changes in the learning process, by collaborating the modern learning objectives and contextual understanding and make more sense under the Covid-19 pandemic. Hybrid learning is one of the alternatives that can contribute to flexible learning system and different student conditions. The 21st-century learning requires students to learn and understand contextually whereas the discovery learning can facilitate the process.

Hybrid learning was first proposed by Martyn (2003) who altered the face-to-face meeting into online learning. Allen *et al.,* (2007) developed hybrid learning into blended learning which reconstructs proportional combination between face-to-face and virtual meeting. Tashiro *et al*., (2011) introduced 5 types of hybrids learning to implement the constructed syntax. Yamagata (2014) on other hand offered new terms, called blended learning which applies asynchronous and synchronous learning schemes for distance education and mixed instruction. In addition to the theoretical framework of hybrid learning, a theoretical framework of discovery learning was also applied. Further, the discovery learning was first proposed by Bruner (1961) who offered direct learning by collecting data from the field. This theory reinforces the concepts taught in class to be proven contextually. In 1986 this theory was developed as proposed by Holland (1986) to produce abstract knowledge structures such as concepts and rules with inductive reasoning about non-abstract learning materials. Hammer (1997) also emphasizes the same direction, but by integrating traditional content and a special learning agenda/topic. Neber (2010) stated the important step in the discovery learning stage is the sequence of cognitive or inductive reasoning processes analyzed in terms of the inquiry cycle, and is analogous to the investigation net, learning cycle, or as regulation cycle. This learning model can be applied for implicit patterns to elicitation situation and or for conducting learning simulation.

The major theoretical framework for developing the Hybrid Discovery Learning model is shown in the table 4. The two keywords namely hybrid and discovery learning, is actualization of online learning but still uphold the contextual learning. The syntax used is considered capable of providing meaningful learning on integrated social studies topics. Not only conceptual learning but also students are expected to be able to directly observe social interactions in the learning activities.

Hybrid education can help to overview the educational process better, imitating real activity, for instance like in a garden where the location, soil condition, watering, algae, trees, all share beautifulness, specific function, but also common understanding that can motivate learners. Watson and Sutton (2012) extrapolated general acceptance of educational principles for online discussion and demonstrated the importance of student participation and interaction

with the school and among students. An empirical study by Ring *et al*. (2012) showed how students' attitudes towards the course management system, their perception of support, and their ability to control behavior were related to their intention to follow the courses. Marks *et al.* (2005) found embedded web links to be significantly associated with teacher-student interactions, student-student interactions, and student group projects, audio or video transmissions and described the learning experiences.

Comer and Lenaghan (2012) developed using two concepts namely original examples, such as personal experiences in organizations related to the subject being studied, and through value-added experiences, for instance comments that add meaning and enhance better the discussion in learning. Both concepts, personal experiences and value-added concept can support students to engage and learn easier in online learning environment. Other researcher developed and tested management education using the Internet Readiness Scale. This scale has a concise 12-point measurement structure covering the four dimensions of skill proficiency, process flexibility, quality planning process, and orientation and be autonomous. Arbaugh (2014) analyzed integrated online education management comprehensively and found that the online education can control student learning process, student group cohesion, and student collaboration better, these are the advantages environment of integrated online-mixed learning.

This study based on FGD results shows that explicit guidance is needed for students to move from their limited imagination to a larger understanding of concepts. Importantly, this study shows that barriers to understand the concept of source confidence threshold can be overcome through online tutorials using experiential learning and self-discovery. This indicates that students are not only imitating the conceptual understanding, but they are also crossing a new threshold and changing their mindset. The learning model included in this study can encourage students to create and reproduce personal knowledge. Encouraging the creation of personal knowledge is important, given the growing educational literatures on the importance to cultivating students' awareness. In addition, the experiential environment encourages diverse learning, where students acquire knowledge based on their individual learning needs. The creation of this personal knowledge is the major feature of this HDL model. This study supports educators with online educational tools which can help students to develop their potential based on the reliability smart threshold concept.

Conclusion

We conclude that based on the research development and descriptive qualitative approach, a new adapted learning model which is combining the hybrid learning and discovery learning models into Hybrid Discovery Learning (HDL) model will be great solution during the Covid-19 pandemic but also for the new future. The FGD supports and confirms that the HDL is eligible for implementing in the integrated social studies, benefiting students, and achieving efficiently students learning outcomes, but require high literacy in computer software and digital platform of both parties, teachers and leaners.

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