Contextualization of learning models in subak system for vocational education

I M. Candiasa¹, N. Santiyadnya², N. Sukajaya³, and G. K. A. Sunu⁴

¹,³ Mathematics Education, Ganesha University of Education, Singaraja
² Electrical Engineering Education, Ganesha University of Education, Singaraja
⁴ Moral Education, Ganesha University of Education, Singaraja

E-mail : acandiasa@undiksha.ac.id

Abstract. Subak is a traditional institution in Bali in charge of regulating irrigation systems for agricultural purposes. Management of irrigation systems includes maintenance of water sources, water drainage techniques, and water distribution. Subak has been passed down for generations since hundreds of years ago. The existing learning model in subak has been able to inherit technical skills and management ability to maintain the existence of subak. Considering these conditions, it is necessary to contextualize the learning model in the subak system to be applied in vocational education that emphasizes the mastery of skills. This study found that the learning model in the subak system was dominated by shared activities. The learning model is contextualized in vocational education into a model of shared cooperative learning. The learning model has been tested in the real class. The validity of the devaluation model by experts, while the practicality of the model is evaluated by teachers and students with user acceptance testing. Experts who evaluate the learning model provide recommendations that the learning model is relevant for vocational education. Meanwhile user acceptance testing for teacher and student shows that the learning model is quite relevant for vocational education. Student competency test results show that the learning model developed is quite effective. In addition to efficient in time and energy, the learning model gives more opportunities for students to show their potential to innovate.

1. Introduction

Vocational education is designed for learners to acquire the knowledge, skills and competences specific to a particular occupation, trade, or class of occupations or trades [1]. Vocational education provides education for various programs, such as administration, computers, tourism, animal husbandry, agriculture, marine, health, and engineering with a variety of specializations. Graduates are required to master competencies in one program to be able to fill work opportunities and careers in the fields of production, trade, services, or business and other industries. Competencies that must be possessed are not limited to knowledge, skills, and insight, but also characters that show individual virtues, such as honesty, responsibility, and politeness.

Competencies learned are always oriented to the labor market. Study materials are designed in such a way that the competencies produced are in accordance with the needs of the job market. The suitability is in terms of both the required fields of work and the level of competence required. The competencies that are taught are not only mastered, but are able to be applied and developed in the workplace. Thus the graduates gain several benefits including the ease of getting a job, reducing skills...
mismatch, integration into the labor market, career development, and professional status [2]. All of
these have implications for increasing income and living standards [3].

Vocational education also prepares students to develop themselves in the face of rapid changes [3].
Competencies possessed by graduates must be flexible. They must be able to anticipate change and
adapt competencies with the changes that occur. This is necessary because the competencies needed
by the field are always changing, both level and type. It is not uncommon for workers to undergo
termination of employment due to the competencies they possess are not in accordance with the needs
of the business and industry. Those who manage the company sometimes have to close the company
because the products produced are not able to meet market needs.

The focus of vocational education is on the development and application of skills [4]. Learning
models are chosen appropriately so as to provide more opportunities for students to practice, create
and innovate. In addition, the learning model that is applied is also able to develop the character of
students, including self-confidence, cooperation, appreciation, and responsibility. This competence is
needed because in the employment field graduates are required in the frame of collaboration. Thus
dependence on other parties can be reduced, while on the other hand mutual cooperation can be
maintained properly.

There are many learning models that have been developed for vocational education. Some of them
have provided good learning outcomes. Nevertheless, there is still a need to develop learning models
for vocational education, especially those that can optimally combine skills and character
development. The intended learning model is able to deliver students to achieve industry standard
competencies through the stages of the process of achieving standard motorbike, cognitive, and
affective mastery and bring out the results of learning inspirational-intuitive behavior which is
academically described as character learning [3]. The learning model developed is a cooperative
learning model adopted from the subak system.

Subak is a traditional irrigation management system in Bali which governs the distribution of
irrigation water into rice fields [5]. As a community self-help system, subak functions to regulate the
distribution of irrigation flows that irrigate every plot of rice fields. This system is managed in groups
and storied with a specific division of roles for each member. Subak as an irrigation system in it
involves customary law communities who have socio-agrarian-religious characteristics, and are
farmers' associations that manage irrigation water in paddy fields. A sense of togetherness in pursuing
the preservation of natural resources and efforts to increase agricultural production can be seen in the
subak organization. Therefore, subak encourage the participation of members and prevention and
control of the conflict [6].

As a cultural system, subak has a thought-pattern, social, and artifact / material sub-system [7]. All
members bear the responsibility together based on mutual cooperation. All members take part in all
organizational activities in accordance with their respective skills. The power of irrigation systems that
is socio-cultural in nature are: (i) its ability to absorb the technological developments that develop
around it; (ii) its ability to adapt to the dynamics of the surrounding culture; (iii) its ability to be good
governance; and (iv) its ability to organize its flexible and flexible organization in accordance with its
strategic environmental conditions [8]. The education system in subak organizations makes subak able
to be in harmony with technological developments and environmental conditions. In addition, the
common interests that occur in the subak succeed in maintaining unity.

All local wisdom included in the subak organization categorically consists of: religious, cultural,
ecological, institutional, economic, technological, legal and security wisdom [8]. Religious wisdom
focuses on divinity and spirituality. Meanwhile, cultural wisdom focuses on cultural energy that
includes ethics, logic, aesthetics, and practice. Ecological wisdom focuses on conservation, balance
and environmental sustainability. Institutional wisdom focuses on organizational integrity. Economic
wisdom focuses on businesses that are creative and productive. Legal wisdom focuses on aspects of
legality by rewarding those who excel and punish those who are guilty of order and justice.
Technological wisdom focuses on technological capabilities and the ability of traditional farmers to
solve agricultural problems. Security wisdom focuses on safeguarding agricultural products and agricultural areas.

The concept of sharing in the subak system has been able to preserve the existence of subak as a very useful system in regulating agriculture in Bali. Equitable water distribution guarantees the comfort of subak members. Even in everyday life, members of Subak prefer to borrow water [9]. This implies that the water is not the right or part of it but something that is borrowed, so that it must be treated. Awareness of sharing responsibility in the subak system makes activities in the subak system work well. In other words, the concept of sharing has succeeded in preserving the subak and the noble values that are in it.

The concept of sharing in the subak system has been proven to be able to pass on competencies in the field of skills from one generation to the next. Members' active role, the same sense of responsibility, fair and equitable, without any dominating members in various activities has been able to teach subak members to master various skills. These skills are needed in addition to subak activities, are also very necessary in everyday life. The concept of sharing learning is being tried to be adopted to be applied in vocational education. Learning in social groups contained in the subak philosophy adopted in vocational education becomes a type of cooperative learning model.

Cooperative learning models are not the same as just learning in groups. There are elements that distinguish cooperative learning models from ordinary group divisions that are carried out without consideration. The proper implementation of cooperative learning procedures will enable educators to manage the class better. Slavin [10] states cooperative learning is a learning model in which students learn and work in small groups collaboratively with 5 members with heterogeneous group structure. There are five elements in cooperative learning, namely; positive interdependence, personal responsibility, face to face, communication between members, and group process evaluation [11].

The sharing type cooperative learning model developed is deemed suitable to be applied in vocational schools. The development of the elements of practice and theory in the subak system is very relevant to be applied in vocational education that is more concerned with practical competence supported by adequate theory. Terrorist material that is difficult for students to understand after they practice. Experiments or practices can increase theoretical mastery through logical processes. The approach is very relevant to scientific approaches including: 1) observing each stage, 2) practicing in accordance with performance 3) collecting data generated each stage 4) analyzing the results of data using descriptive analysis, 5) associating several findings in the description of learning material to form a conclusion 6) communicate the results achieved whether according to the criteria set and make reports.

2. Method
This study adopts Borg & Gall's development model [12] with ten stages, assesses need to identify goals, conduct instructional analysis, learner and contexts analysis, write performance objectives, develop assessment instruments, develop instructional strategies, develop and select instructional materials, design and conduct formal evaluation of instruction, revise instruction, and design and conduct summative evaluation. But in this study the summative evaluation stage could not yet be done. Formative evaluation is done by testing learning models on ICT learning. Evaluation is carried out based on the validity of the model and the effectiveness of the model. The validity of the model was assessed by experts and the results of the assessment were analyzed using the Gregory formula [13]. The use of the learning model was evaluated using user acceptance testing, both from the teacher and student side. Furthermore, the effectiveness of the learning model is evaluated based on student competence.

3. Results and Discussion
The result of the development of this research is the sharing type cooperative learning model. The model developed contains the components recommended by Joyce, Weil, & Calhoun [14] covering syntax, support systems, social systems, reaction systems, and instructional effects as well as nurturant
The shared learning model developed has been tested by three experts. Experts assess the syntax and support system of the learning model using a prepared assessment sheet. Experts provide an assessment of the relevance of each step in the learning syntax and each component of the learning model support system. The expert assessment results analysed by the Gregory formula yielded a validity coefficient of 0.78. Thus, the shared learning model developed has fulfilled the requirements for content validity. So the syntax and support system for sharing cooperative learning models is relevant for teaching learning material in vocational education.

Furthermore, the learning model is empirically tested in the real class in multimedia programs. The trial was held eight times. At the end of the trial, students and teachers were asked to assess the learning model implemented by answering the questionnaire. Teacher assessment shows that the effectiveness of sharing learning models reaches 74%. Meanwhile, student assessments show that the effectiveness of shared cooperative learning models reaches 68%. In addition, at the end of the trial, students' competencies were also evaluated using a performance test. It turns out that the average competency level of students reaches 72%. These results indicate that the effectiveness of the co-assertive learning model sharing in the early stages is quite effective. Even so, there are still many efforts needed to improve the effectiveness of shared cooperative learning models.

The sharing cooperative learning model is quite effective in vocational education learning. The combination of theoretical work and practice in the adopted subak system can still be maintained. Thus, students can integrate theory and practice well. Students can work together in groups and between groups effectively. The concept of sharing that is applied correctly can lead students to achieve optimal cooperative work benefits. The cooperative learning process can facilitate the
development of learning experiences as an effort to accommodate aspects of life skills, especially the academic and social aspects of students. In addition, learning also becomes more meaningful because social and cultural values are encouraged and supported, through the use of context or through personal recognition [15].

The essence of inheriting local cultural values to students also goes well. Efforts to introduce and foster mutual cooperation, a sense of personal responsibility, patience in waiting for their turn, to the responsibility of the group provide optimal results. The fair and equitable treatment for each group member and the same role (without the dominating role of the member) is a differentiator in the shared cooperative learning model. Efforts to implement a subak culture of mutual cooperation through social interactions based on noble values for togetherness are able to fortify students' personalities to avoid social conflicts that often occur today. Alignment of learning material and cultural background possessed by students is able to shape students' knowledge in the learning process.

Democratic values, cooperation, respecting pluralism and being able to learn actively in the sharing type cooperative learning model are in line with the new paradigm of 2013 SMK curriculum development, namely: 1) developing a balance between developing spiritual and social attitudes, curiosity, creativity, cooperation with intellectual and psychomotor abilities; 2) schools are part of the community that provides a planned learning experience where students apply what they learn in school to the community and use the community as a learning resource; 3) develop attitudes, knowledge and skills and apply them in various situations in schools and communities; 4) giving enough time to develop various attitudes, knowledge and skills.

The application of a cultural approach to learning makes learning more meaningful, more contextual that can foster motivation to learn, and preserve culture. Culture-based learning can produce competencies in a single theory and practice. These competencies are expected to emerge in mind set, attitudes and behaviour in society and be inherited continuously from generation to generation. Culture-based learning occurs in collaborations that promote social interaction. Noble values for togetherness, sympathy and empathy also grow from social interaction. The formation of students' knowledge can run in harmony if the subject matter is in accordance with the cultural background of the students. In accordance with Reyhner's recommendations [16] stated that education must be sought to be in a compatible culture and a supportive environment because children's education must include social, emotional, and ethical competencies, as well as academic priorities.

4. Conclusion
The shared cooperative learning model adopted from the subak system has been successfully developed. Learning syntax consists of: (1) delivering goals and preparation, (2) presenting information, (3) organizing students in the learning team, (4) discussions in the problem solving team faced, (5) submitting results, drawing conclusions and evaluating and (6) give recognition and appreciation. The social system in cooperative learning shared in the form of group learning activities where students play an active role, resulting in the transfer of knowledge in the same rights and responsibilities. The teacher plays a role in facilitating learning activities. The principle of reaction in learning is the role of the teacher other than as a facilitator as well as the moderator guiding and evaluating the learning process, providing feedback and assessing the work of students. The support system in the sharing type cooperative learning model is the existence of learning plans, worksheets, and assessment tools. The instructional impact of the application of the sharing type cooperative learning model can be seen from the improvement of students' processes and activities through group learning, and increasing competence. Cooperative learning skills in groups through the collaboration of teachers and students and students with group members, the ability to control themselves, foster an attitude of responsibility, and students' motivation in group learning are the accompanying effects of the type-sharing cooperative learning model.

Sharing cooperative learning models have met the validity requirements in accordance with expert judgment. In addition, the empirical test in the real class shows that the learning model developed has met the requirements of practicality, both from the teacher and student side. Competencies generated
at the initial stage are considered to be adequate. Nevertheless, there are still many efforts that need to be done to perfect the shared cooperative learning model. The effort that needs to be done is to complete the syntax, complete the support system, and vary the cooperative groups, both their formation and activities.

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