B22

by Immy Suci

Submission date: 06-Apr-2022 07:34AM (UTC+0700)
Submission ID: 1802889376
File name: Lampiran_B22.pdf (982.15K)
Word count: 3676
Character count: 20667

Journal of Physics: Conference Series

Local wisdom integrated biology learning program as an alternative to increase generic science skills

Local wisdom integrated biology learning program as an alternative to increase generic science skills

A Ramdani[1,2*], S D Utami[3], I Efendi[3], I N Dewi[3] and I S Rohyani[4]

[1]Program Studi Magister Pendidikan IPA, Universitas Mataram
[2]Program Studi Pendidikan Biologi, Universitas Mataram
[3]Program Studi Pendidikan Biologi, IKIP Mataram
[4]Program Studi Biologi, Universitas Mataram

[*]corresponding author's email: aramdani07@unram.ac.id

Abstract. The integration of the local wisdom of the Mount Rinjani community provides alternative solutions to educational problems that can be tailored to the needs of supplements and substitutions in the learning process. The Local Wisdom Integrated Biology Learning (LWIBL) Program is an innovative learning program designed to improve generic science skills and positive characters of students towards the environment. This study aims to develop and produce a quality LWIBL Program (valid in content and construct, and reliable). The main product is the LWIBL Program which is manifested in the form of the LWIBL Program Book. The quality of the LWIBL Program was obtained through Focus Group Discussion (FGD) activities using an instrument for assessing the quality of the learning programs. The quality analysis of the LWIBL Program uses average validity scores, single measure Inter Coefficients Correlation, and Cronbach's alpha coefficient. The results show the LWIBL Program, with the average content validity of 3.51, construct validity of 3.61, the validity of each aspect statistically ($r\alpha = 1.00$) and reliability ($\alpha = 1.00$), meets the quality of good category. The research implication is that the LWIBL Program is declared qualified by the assessor and it can be used to improve the students' generic science skills and positive character towards the environment.

1. Introduction

The 21st century life and career skills focus on the ability of individuals to work effectively with teams, be open-minded for ideas, set and achieve goals, manage projects effectively, take responsibility for results, demonstrate ethical practices, and be accountable to themselves and the community [1]. The development of the 21st century world economy no longer relies on scientific field skills, but it also needs other skills such as technology and global communication, collaboration, learning and high order thinking skills. This statement implies that there are skills that cross all fields of work which are referred to as generic skills that need to be mastered by college graduates.

Generic skills are transferable and multifunctional skills obtained through school or training. They serve as the foundation for further learning as part of lifelong learning [2]. The generic skills are very useful for continuing education and career success [3]. Likewise it is supported by Yaacob [4] who states that generic skills need to be integrated in learning to produce skillful graduates in the field of work and life. The descriptions mentioned above illustrate the importance of the development of generic skills in learning.

It is understandable that what students learn in college is not fully compatible with the needs of employment. The gap between the competencies of graduates and the competencies needed by the workforce cause college graduates' inability to enter workforce and to be employed by the labor market well. Based on data from the Central Bureau of Statistics [5] in Indonesia there are 9.5% of the total unemployed are college graduates. Factors considered to contribute to the emergence of educated unemployed graduates are the mismatch between their competencies and capabilities and the needs of the job market. This relates to the difficulty of the lecturer helping students understand the abstract concepts, including the biological concept [6]. [7] it is also found that students still have low basic abilities as indicated the lack of asking questions, responding, and reasoning skills, and developing reasoning skills and thinking of solving biological problems faced in everyday life.

Some learning steps that have been used to develop generic skills include the results of research by rickman, et al. [8] through active student-centered learning inolving students in the process of predicting, inferring, connecting, summarizing, visualizing, and questioning. Reena [9] added that a learning setting is needed that to focus on problem solving processes and activities using dialogical learning approaches, task-oriented activities, and cooperative learning environments. Fadly, et al. [10] argues that students' academic skills will increase through learning that is oriented towards activities of discovery, investigation, and guidance. This view is emphasized by Wahyuni, et al. [11] stating that learning programs through a scientific approach are capable of developing student generic skills.

To be able to achieve the above goals, it is urgent to create learning innovation that fulfils high academic legitimacy and relevance to the demands of society. One form of the innovations is to design a biology learning program aiming at providing students with the opportunity to expand and develop generic skills in facing the challenges of the 21st century, without leaving character values as a pillar of national identity through the integration of local wisdoms.

2. Methods

The LWIBL Program and the instrument development were carried out in the even semester of the 2017/2018 academic year, that is January to March 2018. Field research to find out the form of community wisdom in the Mount Rinjani area was carried out in the eastern area of Sembalun Village, western region in Sesaot Village, northern region in Senaru Village, and the southern region in Aik Berik Village.

The produced LWIBL Program development that is produced refers to the design adaptation of the ADDIE development research model [12].

Data from the validation results of the LWIBL Program were analyzed using descriptive qualitative techniques by calculating the average score of the assessment of 3 experts in the Focus Group Discussion (FGD). Experts in the FGD consisted of experts in the field of biology education, experts in the field of science, and experts in the field of language. The validation sheet was filled by experts who reviewed and assessed the LWIBL Program that was developed by researchers during the FGD. Instrument validation sheet of the LWIBL Program was used to obtain data on validity and reliability. The validity of the LWIBL Program was assessed based on the content validity and construction validity [13] conducted by three expert assessments using the assessment rubrics. The FGD results are used as the references for revising the LWIBL Program. The validity of the LWIBL Program is determined by referring to the results of the assessment with the criteria for the average validity score following to Nieveen, et al. [13]; Dewi, et al. [14]. Further analysis to determine the quality of the programs that have been developed in terms of validity and reliability analysis using single measure Inter Coefficients Correlation (ICC) and Cronbach's coefficien alpha. The validity and reliability of the LWIBL Program was determined based on the formula of validity $r\alpha$ = (Mean Square - Mean Square Residual) / (Mean Square People + (31) + Mean Square Residual) and Cronbach's alpha $\alpha = k\, r\alpha / [1+ (k- 1)\, r\alpha]$ [19]. The LWIBL Program is said to be valid if $r\alpha >$ r table and invalid if $r\alpha \leq$ r table. To strengthen the quality analysis of the LWIBL Program, it is presented in the qualitative data obtained during the FGD.

3. Result and Discussion

Validation carried out in the development of the LWIBL Program was conducted by asking the opinions of expert lecturers about content validity and constructs [13]. The aspects examined in the learning program are presented in Table 1.

Table 1. Results of the Content Validation and Component Validity of the LWIBL Program

Component	Validity and reliability of LWIBL Program				
	Score	**rα**	Validity	α	Reliability
Content validity					
1. Need for LWIBL Program	3.82	.67	Very Valid	.53	Reliable
2. State of the art knowledge	3.00	1.00	Valid	1.00	Reliable
3. Theories that support the LWIBL Program	3.00	1.00	Valid	1.00	Reliable
4. Planning and Implementation	3.78	1.00	Very Valid	1.00	Reliable
5. Evaluation	3.57	.61	Very Valid	.55	Reliable
6. Follow-up on the results of development	3.89	1.00	Very Valid	1.00	Reliable
Construct validity					
1. Rational of LWIBL Program	3.00	1.00	Valid	.98	Reliable
2. Theoretical and empirical support	3.00	1.00	Valid	.97	Reliable
3. Learning steps	3.78	1.00	Very Valid	1.00	Reliable
4. Social system	4.00	1.00	Very Valid	1.00	Reliable
5. The principle of reaction	3.90	.66	Very Valid	.96	Reliable
6. Support system	3.60	1.00	Very Valid	.98	Reliable
7. Instructional impacts and accompaniment impacts	4.00	1.00	Very Valid	1.00	Reliable

Table 1 provided information that the developed LWIBLP was declared valid. Content validity is declared valid because it has fulfilled the needs and is designed based on the state of the art. Data on content validity show that the LWIBL Program can be used to facilities competencies according to the demands of 21st century skills, namely generic skills. Global competency needs in the form of generic skills are transferable competencies that can be applied to various cross-disciplinary fields. This ability does not depend on the domain or scientific discipline but refers to cognitive strategies [15]. It LWIBL Program is used as innovative learning that not only trains generic skills in students, but is also expected to be able to improve the positive character of students towards the environment. It is strengthened by the opinion [16] stating that the integration of local wisdom learning outcomes will be obtained that contribute to the students' social environment. Validators also agree that the LWIBL Program meets the demands of the times in accordance with the Indonesian National Qualification Framework (INQF) curriculum, namely, that one of the undergraduate qualifications is able to apply logical, critical, systematic and innovative thinking in the context of development.

The validation results of the LWIBL Program developed have fulfilled the validity requirements in the construct as listed in Table 1. Construct validity is stated to be very valid because it is logically designed and there is consistency among the stages in the LWIBL Program, consistency between components, and consistency with the theory underlying it. The validity shows that the LWIBL Program was developed very well and facilitated students to take advantage of various learning resources and learning environments. [17] states that all the patterns contained in a good learning model can lead to the achievement of learning outcomes. Based on the data presented in Table 1 of the 13 items that were validated, all items had Cronbach's alpha values above 0.6 or were acceptable. According to Liu, the learning program used for the trial has a Croncbach 0.6 alpha value limit [18], so that with the data the learning program developed can be accepted and declared valid and reliable to measure student generic skills.

The validity of the LWIBL Program can be achieved because the development of this program was developed through a repetitive process. The LWIBL Program was developed based on the results of initial investigations conducted at IKIP Mataram including: students, lecturers, and those who carry the capacity of educational institutions. The next stage is the design of the program covering: 1) analysis of

the initial investigation to determine program objectives, 2) further study of the theory underlying the content and construction of the program, 3) designing program components based on supporting theories. A hypothetical program designed to be validated by a team of experts according to their field of expertise. The results of the validation of the learning program resulting in several revisions. The revised hypothetical program is further improved and rearranged based on the suggestions from the validators, hereinafter referred to as prototype I. The next stage is repeated program testing which aims to find LWIBL Program weaknesses or shortcomings. The process of analysis and revision is based on the weaknesses found, so the valid, practical, and effective prototype is obtained. This is in line with the opinion that a valid learning program can encourage the growth of students' pleasure in learning, increase motivation in doing assignments, make it easier for them to understand concepts so that they can achieve better learning outcomes [10]. The product of LWIBL Program is expected to provide a variety of learning models that can help lecturers in overcoming difficulties in teaching abstract biology material by utilizing the value of local wisdom, and it can develop students' ability to be able to think reflective and environmentally sound.

The LWIBL Program was developed through cognitive and social constructivism views. Students actively build creativity in biology learning from their personal experiences with others and the environment. The development of learning programs to improve generic science skills and the positive character of students towards the environment applies Piaget's cognitive constructivism view of the condition of being equilibrated. Students' thinking to foster their learning motivation, as well as the importance of the availability of a learning environment, material and tasks that stimulate the development of creativity in the learning process [19]. Bruner's notion of guided discovery can also facilitate active involvement and openness of student ideas in solving problems in an interesting and fun way, and gives a great emphasis on language and communication [20]. Bandura's social constructivism requires creativity to be taught through modelling, where through observation students can do informati3 processing through the processes of attention, retention, production, and motivation, and applying self-regulated learning to control all aspects of their own learning from beginning to end of learning [19]. Vigotsky's notion of being famous for The Zone of Proximal Development [21] and Zone of Emotional Development [22] allow scaffolding to construct positive processes and characters, as well as student knowledge through modeling, peer tutoring**,** and collaboration**.**

The novelty of the LWIBL Program when compared to biology learning programs in general in improving generic science skills and positive character of students towar5 the environment lies in the learning stage. The LWIBL Program consists of 5 learning steps, these are: 1) exploration, 2) orientation, 3) elaboration, 4) articulation, and 5) confirmation. This stage of learning is designed so that students better understand and associate learning content with local wisdom. Students need to be equipped with cross-field skillswhich are in accordance with cultural values, with the aim that balanced the interpersonal potential with intrapersonal intelligence is re5uired to compete on an international level. Students carry out exploration activities (field practicum) to identify the form of local wisdom of the community in the Mount Rinjani area which is divided into 4 regions: sembalun Village, Senaru Village, Aik Berik Village, and Lenek Duren Village through interviews, observation, and literature studies. The three methods in the exploration phase of the LWIBL Program, do not only enhance the ability of students to identify local wisdom but also. However, it also train students to gather information by using a student activity sheet (LKM) collaboratively, obser5ng various objects in the field to then be associated with the local wisdom of the local community. In line with the opinion [23] ethnic and cultural diversity h4 the potential for extraordinary scientific knowledge to be explored and enrich learning resources. In face-to-face learning / practicum students propose the latest environmental problems through orientation activities. The effectiveness of each topic on ecology and the environment is the ability to observe, calculate, measure, communicate, interpret data, and conclude almost always taught on every ecological topic [24]. The novelty of the LWIBL Program at the orientation stage trains essential skills to classify, look for time / space relationships, and predict what is given to students when conducting orientation activities.

Furthermore, students do elaboration to gather information from various learning sources about the latest environmental issues and their relation to the local wisdom of the community. The role of the students in learning elaboration activities in general is the activity of building agreements cooperatively and collaboratively. The LWIBL Program has a novelty by adding local wisdom value inventory activities that have benefits to improve the quality of life of the community, and students connect with existing science knowledge. The results of [25] study provide support that local science and wisdom can be juxtaposed as materials that can be learned at once. Students share information (articulation) that has been obtained with the other groups. The activity carried out by the students in this stage is to provide experience to study learning resources and communicate information that has been obtained from the field in accordance with the concepts being studied. The last stage is to confirm or feedback activities on what students produce through their learning experience.

4. Conclusion

LWIBL Program consists of 5 learning stages, namely 1) exploration, 2) orientation, 3) elaboration, 4) articulation and 5) confirmation. The results show that the LWIBL Program with the average content validity of 3.51, construct validity of 3.61, with the validity of each aspect statistically ($r\alpha = 1.00$) and reliability ($\alpha = 1.00$), so the LWIBL Program meets high quality. The implication of this study is that a quality LWIBL Program by expert assessors can be used to improve generic science skills and positive character of students towards the environment. Further research can be carried out to test the practicality and effectiveness of the LWIBL Program.

5. References

[1] Pacific Policy Research Center 2010 *21st Century Skills for Students and Teachers* Honolulu: Kamehameha Schools, Research & Evaluation Division.
[2] European Commission 2007 *Key Competences for Lifelong Learning* Luxembourg: European Reference Framework
[3] Yeung S S, Ng-wong S W C and Liu P 2007 *Generic Capabilities for Lifelong Education: Conceptualization and Construct Validity* Australian Association for Research in Education, Fremantle
[4] Yaacob M 2011 Integrating generic competencies (GCs) Tinto University's compulsory courses: perspective of lecture and student's *Procedia Social and Behavioral Sciences* **59** 514-583.
[5] Badan Pusat Statistik 2014 *Berita Resmi Statistik: Keadaan Ketenagakerjaan Agustus 2014* www.bps.go.id
[6] Zirconia A, Supriyanti F M T and Supriatna A 2018 Generic science skills enhancement of students through implementation of ideal problem solving model on genetic information course *IOP Conf. Series: Materials Science and Engineering* **349** 012008
[7] Utami S D, Effendi I, Dewi, I N, Ramdani A and Rohyani I 2018 The study of local wisdom of ethnic sasaks in development of biology instructional learning program (P3Bio) based on 21st Century Skills *Advances in Intelligent Systems Research (AISR)* **157** Mathematics, Informatics, Science, and Education International Conference
[8] Brickman P, Gormally C, Hallar B and Armstrong N 2009 Effect of inquiry based learning on students science literacy skill and confidence *International Journal for Scholarship of Teaching and Learning*. **3** 2 1-22
[9] Reena G 2011 Fostering generic skills through participatory learning strategies *International Journal of Fundamental Psychology and Social Science* **1** 1 14-16
[10] Fadly W, Soegimin W W and Poedjiastoeti S 2011 Pengembangan program pembelajaran praktikum fisika dasar berorientasi heuristic terbimbing untuk meningkatkan kecakapan akademik mahasiswa *Jurnal Penelitian Pendidikan Sains* **1** 1 36-43
[11] Wahyuni I, Amdani K and Harahap H M 2015 Pengembangan program pembelajaran berbasis pendekatan pembelajaran saintifik untuk meningkatkan keterampilan generik sains calon guru fisika *Jurnal Inovasi Pembelajaran Fisika* **3** 2 29-42

[12] Dick W and Carey J O 2006 *The Systematic Design of Instruction* Addison-Wesley Educational Publisher
[13] Nieveen N, McKenney S and Van d Akker 2009 *Educational design research* New York: Routledge
[14] Dewi I N, Ibrahim M and Poedjiastoeti S 2017 Validitas model pembelajaran integrasi kearifan lokal (IKL) untuk melatihkan keterampilan penyelesaian masalah *Prosiding Seminar Nasional Pendidikan Biologi UNY*
[15] Gibb J 2002 *The Collection of Research Reading on Generics Skill in VET* http://www. Ncvr.edu.
[16] Mungmachon R 2012 Knowledge and Local Wisdom: Community Treasure *International Journal of Humanities and Social Science* **2** 13 174-18
[17] Arends R I 2012 *Learning to Teach* New York: Mc. Graw-Hill
[18] Ugulu I, Sahim M and Baslar S 2013 High school students environmental attitude: sale Development and validation *International Journal Science* **5** 4 415-424
[19] Moreno R 2010 *Educational Psichology* New Mexico: John Wiley & Sons
[20] Beetlestone 2011 *Creative Learning* Jakarta: Erlangga
[21] Slavin R E 2011 *Educational Psikology, Theori and Practice* Boston: Pearson Education
[22] Holzman L 2013 Vygotskian-izing psychotherapy *Mind Culture and Activity University of California*
[23] Parmin P, Sajidan S, Ashadi A, Sutikno S and Fibriana F 2017 Science integrated learning model to enhance the scientific work independence of student teacher in indigenous knowledge transformation *Jurnal Pendidikan IPA Indonesia* **6** 2 365-374
[24] Maknun D, Surtikanti R R H K and Subahar T S 2012 Pemetaan keterampilan esensial laboratorium dalam kegiatan praktikum ekologi *Jurnal Pendidikan IPA Indonesia* **1** 1 1-7
[25] Parmin 2015 Potensi kearifan lokal dalam pembelajaran SMPN *Prosiding Seminar Nasional Konservasi dan Pemanfaatan Sumber Daya Alam UNS* 278-282

Acknowledgments
The authors' gratitude goes to the Ministry of Research, Technology and Higher Education for funding the Research (SK Number: 01/K8.0572/L1/SK/IKIP-Mtr/2018). Likewise, the authors' gratitude goes to the IKIP Mataram and Universitas Mataram that have provided collaborative research opportunities.

B22

ORIGINALITY REPORT

20%	19%	8%	9%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	www.e-iji.net Internet Source	7%
2	Submitted to Universitas Pendidikan Indonesia Student Paper	5%
3	files.eric.ed.gov Internet Source	3%
4	www.researchgate.net Internet Source	3%
5	S D Utami, I N Dewi, I Effendi, A Ramdani, I S Rohyani. "The effectiveness of Biology Integrated Learning (BIL) program with local wisdom in area of TNGR Lombok to improve students' self-efficacy", Journal of Physics: Conference Series, 2020 Publication	3%

Exclude quotes	Off	Exclude matches	< 3%
Exclude bibliography	Off		

B22

GRADEMARK REPORT

FINAL GRADE

/0

GENERAL COMMENTS

Instructor

PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7