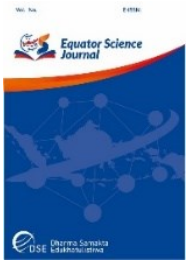
EQUATOR SCIENCE JOURNAL (ESJ)
e-ISSN: 2988-3881
Journal homepage:
https://ejournal.edukhatulistiwa.com/index.php/ESJ



Development of CTL-Based Handouts to Improve the Motivation and Learning Outcomes of Science Students in Grade VII

Ernia Nuraini[1*], Ahmad Amin[1], Ovilia Putri Utami Gumay[1]
[1]Universitas PGRI Silampari

Received: January 14, 2025. Revised: January 25, 2025. Accepted: January 31, 2025.
First Available Online: February 16, 2025. Publication Date: February 28, 2025.
DOI: 10.61142/esj.v3i1.197

**Corresponding author:* ernianuraini6@gmail.com

Keywords *:*
Development, Handout, Contextual Teaching and Learning (CTL)

ABSTRACT
This researcher aims to develop handouts based on Contextual Teaching and Learning (CTL) to increase motivation and learning outcomes for Class VII students at SMP Negeri 7 Lubuklinggau. The method used is Research and Development (R&D) with a 4D development model but its application only reaches the 3D stage, namely: definition stage, design stage, development stage. The research sample or research subjects were students in class VII-2 of SMP Negeri 7 Lubuklinggau. The data collection technique uses a validation sheet. Based on validator analysis, it shows that the quality of learning media meets the very valid criteria with (1) 28 media validation results with a range of $25.2 < X \leq 30$, 21 language validation results with a range of 17.38, (2) increasing motivation 36.16 and 42.96 and (3) learning outcomes 0.58. So it can be said that the Contextual Teaching and Learning (CTL) based handouts were developed and validated as innovative teaching materials that can increase motivation and can be used in learning, with validation categories of good media expert, very good language expert, and very good material expert. Meanwhile, learning motivation shows a good category with an average N-gain of learning outcomes in the High category.

INTRODUCTION

The word yard refers to the land surrounding a community settlement that is managed so that it can fulfill the wishes of the homeowner. A yard is a traditional usable land that is located near the house and can be planted with various plants (Wakhidah et al., 2019). The beginning of the emergence of ornamental plants in people's home gardens has been done since centuries ago. Cultivation of ornamental plants is easy to do in Indonesia because this country has the potential for fertile soil and a tropical climate to support the creation of the habit of planting ornamental plants (Zahra et al., 2023).

Indonesia has a policy in the curriculum that currently applies none other than the independent learning curriculum. The Merdeka Curriculum learning design is that students are given the opportunity to learn in a relaxed (Mu'aziyah & Isnawati, 2023), calm, happy manner (Nurharini et al., 2024), and the focus of independent learning is the freedom to think creatively and independently (Indriani & Suryani, 2023). One of them is in science learning, students are required to be active, creative and innovative. Science learning is a science that studies the natural environment and its contents. This means that science studies everything that is inside, events and symptoms that appear in nature (Mutmainah et al., 2022: 7). Science is an empirical science that discusses facts and natural phenomena. These natural facts and phenomena make verbal science learning also factual (Widyawati, 2021). Natural Science or Science is a science that develops from the philosophy of science, a science that is very necessary in human life (Christine & Damayanti, 2023). Science learning consists of attitudes, processes and products. This means that science learning is also an activity that actively uses the mind to study the symptoms that exist in nature or the environment around us so that we know that the living environment can be used as a source of learning through learning media.

Learning media is of course very influential in the learning process, usually teachers combine learning media with learning models that are appropriate to the material being taught. Handouts are usually written teaching materials that are expected to support other teaching materials or explanations from the teacher. Handouts include printed media that include materials provided on paper for teaching and information (Ismiyatun et al., 2024). A handout is a description of teaching materials in the form of a curriculum or teaching preparation, which can be a summary of the materials contained in a textbook. Handouts are basic material for students to then deepen and expand both in learning activities, field activities, and through the study of mandatory source books and references (Pratama & Sakti, 2020). A handout is a printed teaching material that is used briefly to guide students in following the learning process, the aim of which is to help students carry out learning in a directed and focused manner, because the handout consists of grids that will be conveyed by the teacher as well as summaries from several sources (Setiawan & Jatmikowati, 2021). The existence of handouts helps teachers in delivering material by using adapted learning models (Supriyatman et al., 2024). Science learning in this research uses the Contextual Teaching and Learning model which combines learning with real life contexts.

The learning model used is Contextual Teaching and Learning (CTL). Contextual Teaching and Learning (CTL) is a learning concept that emphasizes the relationship between learning material and students' real life context, so that students can implement it in everyday life (Khairani & Suriani, 2023). Through the process of application in daily life, students will feel the importance of learning and they will understand deeply what they have learned (Desi et al., 2023). Contextual Teaching and Learning (CTL) is an educational process that aims to help students understand the academic material they study by linking subjects to the context of their daily lives, namely in the context of their personal, social and cultural situations (Sunarsih, 2021). The steps of CTL are: 1) An activity that is able to develop thinking; 2) Learning activities that can encourage an attitude of curiosity; 3. Learning activities that can condition students to be able to observe and investigate; 4) Learning activities that are able to create learning conditions in groups; 5) Learning activities that can show a model that can be used as a role model; 6. Learning activities that are able to provide reflection; and 7) Real assessment (Kusmayanti, 2020).

It can be concluded that science learning for students is not only about the learning process that is developed. However, the choice of learning models and media must of course be given great attention. Science learning, which many students consider boring and monotonous, is seen differently if it is mixed and matched with learning models and media. Many of the learning models used in this research have

implemented the Contextual Teaching and Learning (CTL) learning model which is able to improve student learning outcomes. This is the reason for researchers to develop teaching materials in the form of Contextual Teaching and Learning (CTL) based handouts which are able to develop student motivation and learning outcomes through science learning on handouts which are equipped with Contextual Teaching and Learning (CTL) learning stages.

METHOD

Research methods are a scientific way to obtain data with specific purposes and uses. The scientific method means that research activities are based on scientific characteristics, namely rational, empirical and systematic. Rational means that research activities are carried out in a reasonable manner, so that they are within reach of human reasoning. Empirical means that the methods used can be observed by humans, so that other people can know and observe the methods used. Systematic, which means that a process used in research uses certain logical steps (Sugiyono, 2021:2-3).

Based on the problems of the research, the type of research method that will be used in this research is the Research and Development (R&D) method using the 4D model. Research and development Research and Development is a research method used to produce a Handout product and then test the product. In this study, the procedure chosen by the researcher refers to the systematic 4D development procedure. The following is the 4D development procedure. The stages carried out using the 4D model are because they have clear stages and steps, namely: definition, design, development and dissemination.

Definition
At this stage the researcher determines what needs are carried out in developing the handout. In the define stage, researchers used 5 stages including: front end analysis, student analysis, task analysis, concept analysis and specification of learning objectives.

Design
The design of the handouts developed was carried out using constructing criterion-referenced tests, media selection, format selection, initial design.

Development
After designing the handout to be developed, the researcher chose the material development stage as follows: 1) Expert appraisal is a technique for validating or assessing the feasibility of a product design, 2) Developmental testing is the activity of testing product designs on real target subjects.

Disseminate
At this stage, the product that has been revised at the development stage is then printed and implemented on the actual target. Due to time and budget limitations, this is only given to research schools.

The data collection technique in research is a validation sheet, namely validation by media experts, language experts and material experts. The validation sheet used to validate the product being developed is in the form of an open questionnaire by providing open comments and suggestions from each validator. The questions asked related to Contextual Teaching and Learning (CTL) based handouts.Technical data analysis to determine the suitability of the handout:

$$x = \frac{\sum x}{n}$$

Information
x = average score
$\sum x$ = the total score of each assessor for a particular component
n = number of assessors

The calculation results of the feasibility value in the form of a quantitative score are then converted into qualitative data (interval) on a five scale. The data conversion categories are adjusted to the trend level which can be seen in table 1.

Table 1. Conversion of Actual Scores into Scale Values 5

Formula	Mark	Classification
$X < \bar{X}_i + 1{,}8 \times sbi$	A	Verry Good
$\bar{X}_i + 0{,}6 \times sbi < X \leq \bar{X}_i + 1{,}8 \times sbi$	B	Good
$\bar{X}_i - 0{,}6 \times sbi < X \leq \bar{X}_i - 0{,}6 \times sbi$	C	Enough
$\bar{X}_i - 1{,}8 \times sbi < X \leq \bar{X}_i - 0{,}6 \times sbi$	D	Not Enough
$X < \bar{X}_i - 1{,}8 \times sbi$	E	Verry Less

Student learning motivation can be measured using a motivation questionnaire and to determine the increase in student learning motivation it can be analyzed through percentages using the following formula:

Table 2. Calculation of Student Motivation Questionnaire

Percentage	Category
$80\% \leq \text{Percentage} \leq 100\%$	Verry Good
$60\% \leq \text{Percentage} \leq 79\%$	Good
$40\% \leq \text{Percentage} \leq 59\%$	Not enough
$20\% \leq \text{Percentage} \leq 39\%$	Verry less

Student learning outcomes can be measured using pretest and posttest questions and to find out student learning outcomes are analyzed through standard gain values using the following formula:

Standard Gain = $\bar{x} = \frac{\bar{x}\ \text{after} - \bar{x}\ \text{before}}{\bar{x} - \bar{x}\ \text{before}}$

Table 3. Standard Gain Values

Value <g>	Classification
G ≥ 0,7	Tall
0,7 > g ≥ 0,3	Currently
0,3> g	Low

Source: (Taufik, 2023:114)

RESULTS AND DISCUSSIONS

This research is research that uses developments developed using research design and 4D model development. This development model consists of 4 stages, namely the define stage, design stage, develop stage and disseminate stage. The result of this research and development is a Contextual Teaching and Learning (CTL) based handout to perfect the handout developed in terms of media, language and material. So the handout can be said to be suitable for testing on class VII-2 students at SMP Negeri 7 Lubuklinggau. The three validators appointed through recommendations to provide assessments, criticism and suggestions for media, language and materials are: media validator, namely Mr. Dr. Dodik Mulyono, M.Pd. The language validator was carried out by Mrs. Sri Murti, M.Pd. Material validator was carried out by Mrs. Firwanti, S.Pd.

Table 4. Media Expert Validation Results

No	Score Range (i)	Value	Category
1	X > 30,6	A	Verry Good
2	25,2 < X ≤ 30	B	Good
3	19,8 < X ≤ 25,2	C	Fairly Good
4	14,4 < X ≤ 19	D	Less
5	X ≤ 14,4	E	Verry Less

Based on the table above, the converted media expert validation data was obtained at 25.2 < So that handouts based on Contextual Teaching and Learning (CTL) are suitable for use with revisions according to suggestions so that they can be tested on students.

Table 5. Linguist Expert Validation Results

No	Score Range (i)	Value	Category
1	X > 20.4	A	Verry Good
2	16.8 < X ≤ 20.4	B	Good
3	13.2 < X ≤ 16	C	Fairly Good
4	9.6 < X ≤ 13.2	D	Less
5	X ≤ 9.6	E	Verry Less

Based on the table above, the converted linguist validation data obtained is, So that handouts based on Contextual Teaching and Learning (CTL) are suitable for use with revisions according to suggestions so that they can be tested on students.

Table 6. Validity Guidelines

No	Score Range (i)	Value	Category
1	X > 17.38	A	Verry Good
2	14.79 < X ≤ 17.38	B	Good
3	11.94 < X 15	C	Fairly Good
4	9.62 < X ≤ 12.21	D	Less
5	X ≤ 9.62	E	Verry Less

Based on the table above, the converted material expert validation data is obtained, X > 17.38. This means that the results of the material expert validation assessment are in the very good category. So that handout based on Contextual Teaching and Learning (CTL) are suitable for use with revisions according to suggestions so that they can be tested on students.

One thing measured in this research is an increase in student learning motivation. Increased student learning motivation is calculated based on the scores obtained on the learning motivation questionnaire before and after learning using Contextual Teaching and Learning (CTL) based handouts. To find out the results of student learning motivation, you need to calculate the percentage in detail. The results of the analysis of increasing student learning motivation can be seen in table 7.

Table 7. Results of Analysis of Increasing Student Learning Motivation

Initial Motivation Score			Final Motivation Score		
Min	Max	Avarage	Min	Max	Average
69%	83%	36,16	79%	96%	42,96

Based on the table above, the calculation of the student motivation questionnaire before studying using handouts resulted in an average score of 36.16 and was categorized as good with a percentage of 75%. And in the calculation of the student motivation questionnaire after learning using handouts, the average score was 42.96 and was categorized as very good with a percentage of 90%. This is because students have more motivation to learn after using Contextual Teaching and Learning (CTL) based

handouts. Motivation is very important in learning activities, because motivation encourages enthusiasm for learning and conversely a lack of motivation will weaken enthusiasm for learning (Suharni, 2021). And this learning media only takes the form of handouts or print, but these handouts are good for use in the learning process.

The test questions given by researchers to students were in the form of pre-test and post-test questions. Giving questions to students aims to see an increase in student learning outcomes before and after using handouts based on Contextual Teaching and Learning (CTL) developed by researchers.

Meanwhile, each student's learning outcomes can be seen from the pretest and posttest and improvements in student learning outcomes can be seen through the difference in pretest and posttest scores. The analysis technique used to determine the increase in student learning outcomes is by calculating the standard gain value and then converting this value into categories. It can be said that the score obtained at the posttest is greater than the pretest score. The following table shows a summary of the analysis of improving student learning outcomes

Table 8. Results of Analysis of Improving Student Learning Outcomes

Pretest Score			***Posttes Score***			**Standard Gain**
Min	Max	Average	Min	Max	Average	
9	40	18,32	17	80	57,76	0,58

Based on the table, it was found that 12 students had high criteria with a value of G, then 8 students had medium criteria with a value of 0.7 > g 0.3, while 5 students had low criteria with a value of 0.3> g. Then the overall average of students had a gain of 0.58 which was categorized as moderate, but the learning outcomes of each student increased.

Therefore, the handouts developed by researchers are suitable for use in school learning so that they can improve student learning outcomes. This is in accordance with the opinion of (Rosalia et al., 2022) who stated that the purpose of handouts is to help students improve the information presented, and to improve and support the learning objectives. So it is concluded that these handouts can improve student learning outcomes.

From the discussion regarding handouts based on Contextual Teaching and Learning (CTL) to increase the motivation and learning outcomes of class VII students at SMP Negeri 7 Lubuklinggau which have been developed by researchers, it can be concluded that student learning outcomes have increased using handouts based on Contextual Teaching and Learning (CTL), namely from the results of pre- test and post-test of students, the test results obtained a gain value, namely that 12 students had high criteria with a value of $G \geq 0.7$ then 8 students had medium criteria with a value of $0.7 > g \geq 0.3$ while 5 students had low criteria with a value of 0.3> g. Then the overall average of students had a gain of 0.58 which was categorized as moderate, but the learning outcomes of each student increased.

CONCLUSION AND SUGGESTION

Based on the results of the calculation data analysis from table 2 which is the result of calculations from the media validation results, $25.2 < X \leq 30$, the assessment results from the media validator are included in the Good category. The results of the media validation received criticism and suggestions so that they can be used for revision and are suitable for testing on students. From table 3 of the language validation calculations, namely $X > 20.4$, the assessment results are included in the Very Good category. From the language validation assessment, criticism and suggestions were obtained, namely improving the writing of prefixes and some words. So that the media developed can be used with revisions so that it is suitable for testing by students. From table 4, the results of material validation calculations by teachers $X > 17.38$ are categorized as Very Good. Based on the validation results from the validator above, Contextual Teaching and Learning (CTL) based handouts can be used at the next stage.

REFERENCES

Akbar, A. (2021). Penggunaan dan nilai ekonomi dari tanaman Aglaonema sp. di kalangan pedagang tanaman hias sekitar Cengkareng dan Pulo Gadung. *Jurnal Bios Logos, 11*(2), 122–128.

Asyhari, A., & Silvia, H. (2016). Pengembangan media pembelajaran berupa buletin dalam bentuk buku saku untuk pembelajaran IPA terpadu. *Jurnal Ilmiah Pendidikan Fisika Al-Biruni, 5*(1), 1–13. https://doi.org/10.24042/jipfalbiruni.v5i1.100

Bago, A. S. (2020). Identifikasi keragaman famili Araceae sebagai bahan pangan, obat, dan tanaman hias di Desa Hilionaha Kecamatan Onolalu Kabupaten Nisa Selatan. *Jurnal Education and Development, 8*(4), 695.

Desi, M., Suhendar, S., & Herlina, H. (2023). Implementation of contextual teaching and learning (CTL) strategies and field visit techniques to improve student learning outcomes in biotechnology materials. *Equator Science Journal, 1*(2), 39–49. https://doi.org/10.61142/esj.v1i2.9

Fadilah, A., Nurzakiyah, K. R., Kanya, N. A., Hidayat, S. P., & Setiawan, U. (2023). Pengertian media, tujuan, fungsi, manfaat dan urgensi media pembelajaran. *Journal of Student Research, 1*(2), 1–17.

Farikhah, W. A., & Saroinsong, W. P. (2020). Pengembangan media buku saku motorik halus untuk anak. *Jurnal PAUD Teratai, 9*(1), 1–11. https://doi.org/10.35896/ijecie.v4i1.106

Hamidah. (2023). *Budidaya tanaman hias.* Bakti Semesta Publisher.

Handayani, P. (2019). Eksplorasi flora potensial sebagai tanaman hias di kawasan wisata Air Terjun Talalang Jaya Desa Telentam Kabupaten Merangin. *Biocolony, 2*(1), 8–11.

Handayani, R., Alfiah, L. N., & Wahyuni, R. R. (2024). Pengaruh arang sekam padi terhadap pertumbuhan dan produksi tanaman bawang merah (*Allium ascolanicum* L). *Sungkai, 12*(1), 1–12.

Harahap, J. P. R., Habibie, D., & Fadlan, M. N. (2022). Analisis biaya manfaat hidrogel sebagai alternatif media tanam di Kelurahan Sidorame Barat I Kecamatan Medan 376 Perjuangan. *Jurnal Pengabdian Ibnu Sina Fakultas Ekonomi dan Bisnis (JPIS FEB), 1*(1), 43–46. https://doi.org/10.36352/j-pis.v1i1.321

Hartanti, R. E., Gumiri, S., & Sunariyati, S. (2020). Keanekaragaman dan karakteristik habitat tumbuhan famili Araceae di wilayah Kecamatan Jekan Raya Kota Palangka Raya. *Journal of Environment and Management, 1*(3), 221–231. https://doi.org/10.37304/jem.v1i3.2568

Hutasuhut, M. A. (2020). Inventarisasi Araceae di Hutan Sibayak 1 Kecamatan Sibolangit Kabupaten Deli Serdang Sumatera Utara. *Jurnal Biolokus: Jurnal Penelitian Pendidikan Biologi dan Biologi, 3*(1), 288–292. https://doi.org/10.30821/biolokus.v3i1.739

Ismail, I., Riandi, R., Kaniawat, I., Permanasari, A., Sopandi, W., & Supriyadi, S. (2024). Education for sustainable development in secondary school: A review and bibliometric analysis. *International Conference on Mathematics and Science Education, KnE Social Sciences*, 1270–1280. https://doi.org/10.18502/kss.v9i13.16069

Ismiyatun, E. Q., Ariani, T., & Gumay, O. P. U. (2024). Validity of handout development based on guided note-taking (GNT) on mechanical wave material. *Equator Science Journal, 2*(1), 14–20. https://doi.org/10.61142/esj.v2i1.112

Juminah, Panjaitan, R. G. P., & Wahyuni, E. S. (2023). Kelayakan buku saku materi sistem ekskresi kelas XI SMA. *Jurnal Pendidikan Informatika dan Sains, 12*(1), 146–153. https://doi.org/10.31571/saintek.v12i1.4149

Khoir, Z., & Aghni, R. I. (2021). Pengembangan media pembelajaran buku saku digital berbasis Android pada mata pelajaran akuntansi dasar. *Kajian Pendidikan Akuntansi Indonesia*, 10(6), 84–99. https://doi.org/10.30736/jti.v6i2.668

Khoiriyah, H., Wahyuni, S., & Zulkarnain, Z. (2018). Implementasi buku saku pendidikan ramah anak sebagai media penyuluhan pendidikan keluarga. *Journal of Nonformal Education and Community Empowerment*, 2(1), 1–8.

Kurniawan, Y. N., Nuraini, N., Kamelia, K., Mantang, R., Zulfadli, Z., & Rupa, D. (2020). Etnobotani tumbuhan famili Arecaceae di Kota Tarakan. *Borneo Journal of Biology Education (BJBE)*, 2(1), 16–23. https://doi.org/10.35334/bjbe.v2i1.1736

Mu'aziyah, S. E. S., & Isnawati, I. (2023). Curriculum change vs changes in the field: How contextual is learning in the Merdeka Curriculum? *Equator Science Journal*, 1(2), 73–79. https://doi.org/10.61142/esj.v1i2.34

Mudjiyanto, B. (2018). Tipe penelitian eksploratif komunikasi. *Jurnal Studi Komunikasi dan Media*, 22(1), 65–74. https://doi.org/10.31445/jskm.2018.220105

Muslimin, R. W. (2019). Jenis dan kelimpahan tumbuhan suku Araceae di jalur pendakian Gunung Nokilalaki untuk dimanfaatkan sebagai media pembelajaran. *Skripsi*, Universitas Tadulako.

Nurharini, F., Muaziyah, S. E. S., & Shidqiyyah, N. (2024). Implementation of educational innovations in student management, facilities, curriculum, and public relations in integrated science-social studies learning at MI Al-Islamiyah Bangil: A case study. *Equator Science Journal*, 2(3), 149–154. https://doi.org/10.61142/esj.v2i3.160

Radifa Zahra, Lestari, M. P. Alibasyah, & Lilies N. Tangge. (2023). Types of medicinal plants in Ombo Village, Sirenja Sub-District and their use as learning media. *Equator Science Journal*, 2(3), 117–123. https://doi.org/10.61142/esj.v2i3.141

Rochman, S., Rustaman, N., Ramalis, T. R., Amri, K., Zukmadini, A. Y., & Supriyadi, S. (2024). Trend and pattern in research on 6E learning by design in science: Bibliometric approach. *International Joint Seminar on Education, Social Science and Applied Science, KnE Social Sciences*, 494–502. https://doi.org/10.18502/kss.v9i19.16537

Rukajat, A. (2018). *Pendekatan penelitian kuantitatif.* Yogyakarta: Depublish.

Sinaga, M. S., & Rakhmawati, F. (2022). Desain buku saku matematika berbasis HOTS kelas X sebagai media pembelajaran. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 6(2), 1301–1314. https://doi.org/10.31004/cendekia.v6i2.1361

Sita. (2021). Mengolah media tanam bekas. Retrieved from https://pertanian.jogjakota.go.id/detail/index/16846.

Supriyatman, S., Kade, A., Darmadi, I. W., Miftah, M., Supriyadi, S., & Ismail, I. (2024). Competence of junior high schools' science teachers in implementing laboratory teaching: A case study on Palu, Centre Celebes. *Jurnal Penelitian Pendidikan IPA*, 10(6), 3114–3122. https://doi.org/10.29303/jppipa.v10i6.7510

Trisnadi, R. (2019). Manfaat arang sekam untuk pertanian. https://www.google.com/search?q=trisnadi+2019+manfaat+arang+sekam&oq=trisnadi+2019+manfaat

Wakhidah, Z. A., & Sari, I. A. (2019). Etnobotani pekarangan di Dusun Kaliurang Barat, Kecamatan Pakem, Sleman-Yogyakarta. *Jurnal EduMatSains*, 4(1), 1–28.

Wugaje, A. L., Hidayat, F. A., Tiro, A. R., & Supriyadi. (2023). Student learning difficulties in middle school science learning during the COVID-19 pandemic: A case study in the Teminabuan District, South Sorong Regency. *Equator Science Journal*, 1(1), 16–23. https://doi.org/10.61142/esj.v1i1.3