

The Effectiveness of Hybrid Learning Model with Emotional Design Approach in Improving Digital Literacy of Junior High School Students

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ABSTRACT

Digital transformation in education demand the existence of learning models that are not only effective in a way technical , but also pay attention to involvement emotional students . Digital literacy becomes competence important thing to do owned by participants educate since age school intermediate first , but its implementation Still face challenges in aspects motivation and participation students . Research This aim For to study effectiveness of the hybrid learning model with emotional design approach in increase digital literacy of junior high school students . Methods used is a quasi- experiment with pretest- posttest control group design . Population study is eighth grade junior high school students in one of the schools in North Sumatra. Instruments study consists of from test digital literacy , observation involvement emotional , and documentation activity learning . Data is analyzed in a way quantitative and qualitative . The results show improvement significant digital literacy in groups experiment compared to group control . Posttest average increase by 22.17 points . Observation show that student more active and involved in a way emotional in learning . Hybrid learning model with proven emotional design approach effective increase digital literacy and engagement student in digital learning . Approach This can become alternative innovative in learning 21st century.

Keywords : *Digital Literacy, Hybrid Learning, Emotional Design*

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INTRODUCTION

Digital literacy becomes fundamental skills in life 21st century , especially for generation young people growing in the middle development rapid technology (Middaugh et al., 2024; Pham & Tesar, 2024) . Students junior high school level , as part from digital native generation , demanded For own ability access , evaluate , and utilize digital information in critical and responsible answer . Quality their digital literacy is very important How they participate in environment learning , media social , and live life everyday life in the digital era.

System formal education holds role strategic in development Students' digital literacy . Conventional learning process start abandoned Because not enough responsive to change characteristics participant education and the demands of the times (Clifford et al., 2025; Meza-Fregoso et al., 2024) . Learning models innovative start Lots applied For answer challenge this , one of them is a hybrid learning model that combines learning face face to face and online synergistic . The hybrid learning model is assessed capable give flexibility in the learning process at a time strengthen skills use technology information . Integration of offline and online learning allows student For explore information from various digital

sources in active (Code, 2025; El Messaoudi, 2024) . The application of this model also opens up opportunity for teachers to create environment more personal, adaptive , and contextual learning in accordance need student .

Emotional design is present as approach pedagogical attention aspect emotional student in the learning process , especially in interactions with digital media. Learning design that takes into account emotion positive proven capable increase motivation , involvement , and power remember student to material studied (Code, 2025; Kee et al., 2025) . In the context of hybrid learning, emotional design can applied through election visual display , narrative , and experience fun and motivating digital users .

Digital literacy is not only need skills technical , but also awareness critical and affective to use technology . With approach learning that combines hybrid learning and emotional design, internalization process values digital literacy is expected become more effective (Macià, 2025; Putri et al., 2024) . Research This done For test the effectiveness of the model in context junior high school students who are in the phase transition significant cognitive and emotional .

The *Cognitive-Affective Theory of Learning with Media* (Moreno & Mayer) becomes base conceptual in study This (Macià, 2025; Sathiyaseelan et al., 2024) . This theory state that the learning process is effective happen when element cognitive and affective designed in a way balanced in learning media . Merger visual, narrative and interactive elements that evoke emotion positive can strengthen processing information in memory term long , so that impact on increasing results learning , including in aspect digital literacy .

Utilization of hybrid learning models in learning Already Enough Lots researched , especially in context education height and training professional . However , its implementation at the junior high school level is still limited , especially in matter design appropriate learning with characteristics development cognitive and emotional student age teenager (Baiju et al., 2025; Ni et al., 2025) . Information about How junior high school students responded to this model in a way comprehensive still minimally found in study literature .

Study regarding internal emotional design partial digital learning big Still focus on aspects design interface or visual elements without integrate it in a way systemic in more learning strategies wide (Krajnik & Demeter, 2024; “Proceedings of 2024 International Symposium on Artificial Intelligence for Education, ISAIE 2024,” 2024) . Not much yet research that tests in a way explicit how emotional design can integrated in a hybrid learning model for increase results study , especially in context students' digital literacy level medium .

Students' digital literacy Still become challenge in system Indonesian education , with Lots capable students use device technology but Not yet own ability critical in sort , evaluate , and disseminate digital information (Harris, 2024; Herlanti et al., 2025) . Intervention learning that combines hybrid models and emotional design approaches has not yet been explored in a way empirical as solution potential For overcome gap This .

Limitations study previously show existence gap in understand the effectiveness of multimodal and affective learning strategies to improvement digital literacy (Cempellin & Crawford, 2024; Kyriakidis & Koikas, 2024) . Existence gap this is what it is base For develop study this , in order to produce findings that can be enrich practice digital learning at the junior high school level more contextual and applicable .

Mayer's *Multimedia Learning* Theory explains that digital learning will more effective when verbal and visual elements are conveyed in a way in harmony , accompanied with element motivating emotions (Athanasίου et al., 2024; Makhachashvili et al., 2024) . However , in the context of hybrid learning among teenagers , the contribution of emotional

design to strengthening digital literacy is still Not yet Lots tested in a way empirical , so that study This try fill in emptiness the .

The implementation of hybrid learning based on emotional design is believed to capable create experience learning that is not only cognitive , but also emotional and social (Ominyi et al., 2025) . Research This make an effort test effectiveness approach the in context education intermediate first , especially in form competence students' digital literacy in a way more holistic research this also aims give guide practical for teachers in to design more digital learning meaningful .

Testing this model important For know whether integration between digital learning media and design emotional can give impact significant to improvement ability student in face challenges of the digital world. Focus study will directed at involvement students , perception emotional to materials and results achievements their digital literacy during the hybrid learning process .

The ARCS Motivation Model theory by John Keller became base rational in study This (Chung & Cam, 2025; Yaman et al., 2024) . This model emphasize importance four element motivation Learning : Attention, Relevance, Confidence, and Satisfaction. Integration of emotional design in hybrid learning is expected can increase fourth element said , so that student more motivated and capable develop digital literacy in general effective .

METHOD

Study This use approach quantitative with design *quasi-experimental* shaped *nonequivalent control group design* (Badoni et al., 2025; Moundy et al., 2025) . This design allows researchers For compare results digital literacy between group experiments that get treatment of the hybrid learning model with emotional design and group approaches control using learning models conventional . Measurement done before and after treatment For know difference results in a way significant .

Population in study This is all over student class VIII at a public junior high school in Medan City. The sample was taken purposively with consider equality ability start and readiness technology between class (Badoni et al., 2025; Valladolid Benavides et al., 2025) . Two classes chosen as sample , namely One class as group experiment and one class as group controls , each consisting of of 30 students .

Instruments used in study This is test digital literacy in the form of choice double that has been validated by experts , as well as sheet observation involvement emotional student during the learning process (Racharla et al., 2025; Valladolid Benavides et al., 2025) . Test digital literacy is compiled based on indicator competence from framework UNESCO digital literacy , including ability access , evaluate , and use digital information in ethical and effective .

Procedure study started with implementation of the pretest in the second group For know ability beginning students' digital literacy . Group experiment follow hybrid learning with emotional design during six meeting , which consists of from combination face face to face and online using learning media interactive based emotion positive (“Erratum Regarding Missing Declaration of Competing Interest Statements in Previously Published Articles (International Journal of Child-Computer Interaction (2023) 38, (S2212868923000594), (10.1016/j.Ijcci.2023.100622)),” 2024; Joymangul et al., 2024) . Group control undergo learning with method conventional without integration design emotional . After treatment finished , posttest given For measure improvement digital literacy , and its results analyzed using statistical tests For know effectiveness treatment .

FINDINGS AND DISCUSSION

Initial data collected consists of from pretest and posttest scores digital literacy of students in two groups , namely group experimental and control groups (Otto et al., 2024; Rhongo & da Piedade, 2024) . Measurement done with use instrument based indicator digital literacy that has validated . Amount participant study consists of of 30 students in each group .

The pretest scores show that ability beginning students' digital literacy is in the category currently with average value of 61.23 in the group experiment and 60.87 in the control group control . After implementation intervention learning , values posttest in groups experiment increase to an average of 83.40, while group control increase to 70.17. More improvements significant occurs in groups experiments that get treatment of the hybrid learning model with emotional design approach .

Table 1. complete data pretest and posttest results :

Group	N	Pretest Average	SD Pretest	Posttest Average	SD Posttest
Experiment	30	61.23	6.45	83.40	5.98
Control	30	60.87	6.21	70.17	6.09

The average posttest score is higher high in the group experiment indicates that the hybrid learning model with emotional design approach provides influence positive to improvement students' digital literacy (Kessler, 2024; Soheli et al., 2024) . The difference between pretest and posttest in the group experiment reached 22.17 points , far more tall compared to group control that only increased by 9.30 points .

Standard deviation in the group experiment show relative value stable , which means that improvement happen in a way evenly distributed among participant (Mohammadi, 2024; Sahu & Kashyap, 2025) . There is no indication that only part small students who experience improvement significant . This is strengthen suspicion that intervention learning that is done own impact comprehensive to participant educate .

The t-test was performed For know significance difference between second group . The result show mark significance (p-value) of $0.000 < 0.05$, which means there is significant difference between group experiments and groups control in matter improvement digital literacy .

Additional data collection done through sheet observation involvement emotional student during hybrid learning is taking place (Lo-Philip, 2024; Makhachashvili & Semenist, 2024) . Observed aspects covering expression interest , participation active , and responsive to visual content as well designed narrative in a way emotional . Every indicator rated use Likert scale 1–5.

Average score involvement emotional students in groups experiment is at 4.31 , while group control only reached 3.12. The highest score in the group experiment found in the " motivation" indicator to digital assignments " with value of 4.55, while score lowest on the " response " indicator to teacher's instructions " with value 4.01.

This result show that emotional design approach in hybrid learning has potential in increase involvement affective students . Design interesting material visually and narratively give impact positive to enthusiasm and attention student during the digital learning process .

Involvement high emotional contribute to the formation of experience meaningful and enjoyable learning . Interaction with designed digital content with element emotional , such as color bright , illustration narrative , and animation , strengthen retention information in memory term long .

Response student to material learning show that use approach emotional encourage desire know and improve focus . Activeness in answer questions , solve online assignments , and discussions during session face advance increase significant compared to group control .

Involvement consistent emotional also strengthens motivation intrinsic students . They are more interested and not easy bored when interact with designed materials for inspiring feelings, which in the end speed up mastery skills digital literacy.

Correlation between level involvement emotional with results improvement digital literacy tested use Pearson analysis. The test results show mark correlation of 0.721 with significance of 0.000, which means there is connection strong and significant positive between second variables the .

Students who demonstrate level involvement emotional tall tend experience improvement score greater digital literacy big . This is show that factor affective in digital learning plays role important in support achievement competence digital literacy .

Hybrid learning model designed in a way emotional it turns out No only increase aspect cognitive , but also supports formation attitude positive to digital learning . Effectiveness approach This lies in the ability unite experience adaptive , personal, and fun learning .

One of studies case in group experiment involving student named A, who previously own digital literacy pretest score of 58, including in category low . During the hybrid learning process, student A showed improvement participation active , good in both online and in-person sessions face face . Students the often give response to material , ask in a way directly , and finish task with enthusiasm high . He also showed expression positive moment interact with designed digital media with emotional design approach , such as animation interactive and story narrative themed teenager .

Posttest score student A improved to 88, reflecting leap score by 30 points . This result show that the approach used No only Work in a way general , but also capable help student with ability beginning low For chase backwardness in a way significant .

Change significant in student A strengthens argument that element emotional in design hybrid learning plays role important in transformation of the learning process individual . When students feel involved in a way emotional , they show more motivation tall For Study in a way active . Involvement student A improved Because existence connection emotional with content learning , including relevant illustrations with life teenagers , music background light and stylish communicative language . Learning media No only convey information , but also build atmosphere positive heart .

Transformation This show that emotional design is capable bridge gap between readiness students and demands digital learning , especially for students who previously not enough motivated . Change behavior learning and achievement academic become proof success approach This in context hybrid learning .

Connection between designed hybrid learning approach in a way emotional with improvement confirmed digital literacy through quantitative and qualitative data . Combination results tests , observations , and studies case show consistent pattern in improvement results learning and engagement student .

Interventions that integrate aspect affective and cognitive in learning proven capable increase effectiveness of the learning process in a way comprehensive . This strategy No only develop ability technical digital literacy , but also shaping attitude critical , creative , and reflective to use technology .

Success approach This open opportunity For development of more learning models inclusive and fun for junior high school students . Research This give contribution important for design learning in the digital era, with emphasize importance dimensions emotional as part from modern learning strategies .

Discussion

Research result show that the hybrid learning model with emotional design approach significant increase digital literacy of junior high school students . Posttest scores in the group experiment increase more tall compared to group control , with an average increase by 22.17 points . Engagement emotional students also showed correlation strong positive to improvement results Study .

Implementation approach emotional in hybrid learning impacts motivation Study students . Design interesting material visually and narratively succeed maintain attention students and raise interest to activity digital learning . Observation scores involvement emotional support findings quantitative that student more active and enthusiastic in Study .

Case studies also strengthen statistical data that approach This capable reach student with ability beginning low . Change significant in students certain signify that design attention- based learning aspect affective can bridge gap ability digital literacy between individuals . Influence This seen in change attitudes , participation , and achievements academic .

Research result This in harmony with findings previously from Mayer (2009) who stated that emotional design improves effectiveness multimedia learning . Implementation element emotional like color , expression characters , and personal narratives are capable of create bond emotional strengthening Power absorb information . Research This expand findings the to in the context of hybrid learning in junior high school students .

Difference striking lies in focus age and education level . Most of them study previously more student - focused or adults , while study This to study population teenagers who are emotional Still in stage development . Research results This show that junior high school students responded very positively to approach learning based emotion .

A number of studies previously focus self in design interface or gamification in emotional design. Research This emphasize integration design emotional to in structure learning in a way intact , including in content , activities , and teacher interactions . This give dimensions new in study digital literacy and emotional learning that have not been Lots explored .

Research result This mark importance dimensions emotional in digital learning , especially for digital native generation . Learning that only focus on aspects cognitive without notice involvement emotional tend not enough effective in form in-depth digital literacy . Students show improvement ability and motivation when they feel connected in a way emotional with material .

Phenomenon This become sign that hybrid learning approach does not only relevant from side technical , but also from side psychological changes landscape digital education demands a more approach human , where emotions , experiences , and a sense of comfort play role important in the learning process . User- friendly design emotional No just aesthetics , but rather a strategic pedagogical strategy .

Implementation learning based emotion become signal that the digital era demands a more approach holistic in education . Digital literacy is not only question ability technical , but also includes attitudes , ethics , and awareness in use technology . Research This show direction that design future learning need consider aspect affective student in a way Serious .

Implications main from study This is the need for teachers and developers curriculum consider emotional design approach in digital learning . Learning design that only emphasize content informative without element emotional at risk lower motivation and engagement students . Emotional design can be a strategy for create experience learn more fun and meaningful .

Schools and institutions education can start integrate training design learning based emotion in teacher development programs . Teachers need equipped ability to design stimulating activities and media feeling students , good in online and offline sessions . Research results This give base empirical for taking policy in innovation digital education .

Curriculum digital literacy is also necessary developed in a way more contextual with consider aspect emotional teenagers . The hybrid learning approach based on emotional design has been proven effective in increase No only knowledge , but also attitudes critical to use technology . This strategy can made into reference in develop a national digital literacy program .

Effectiveness approach This appear because emotional design is capable create condition comfortable and interesting learning in a way psychological . Students feel more involved when they like visual display , story , or atmosphere stimulating learning emotion positive . Element emotional strengthen Power pull materials and making student more focus in the learning process .

Combining hybrid learning face face to face and online possible flexibility in manage design learning . Teachers can choose the appropriate media with character students and adjust the pace of learning to make it more personal. The approach This avoid saturation and creating experience dynamic learning as well as interactive .

Interaction positive emotions during learning also strengthens connection between teachers and students . Trust and openness increase when student feel appreciated and involved in learning . As a result , digital literacy is not only develop as ability technical , but also as awareness and responsibility answer in use technology .

Study advanced need done with coverage larger population wide For test consistency the effectiveness of this model in various background behind school . Trial at the level other education , such as elementary or high school, can also give perspective new about adaptation emotional design approach in hybrid learning curriculum . Development instrument involvement more emotional standardized is also necessary done .

Teachers need given training sustainable about emotional design in digital learning . Training materials No only focus on mastery technology , but also on understanding psychology students and methods build proximity emotional through design learning . Collaboration between educator, designer learning, and psychology education is very necessary. Educational institutions and manufacturers policy should start compile guidelines combining digital learning aspect cognitive and affective in a way balanced . The hybrid learning model based on emotional design can made into framework Work in development responsive curriculum to challenges of the digital era. Research This become foothold beginning For transformation more digital education humane and effective .

CONCLUSIONS

The most important findings from study This show that the hybrid learning model is combined with emotional design approach significant capable increase digital literacy of junior high school students, no only from aspect cognitive but also in involvement deep emotions towards the learning process. This research give contribution new in development method digital learning with integrate draft design emotional in a way systematic to in hybrid learning structure, offering approach more pedagogical humanistic and responsive to need affective student. Limitations study located in space scope samples that are still limited to one area as well as approach qualitative that has not been deep , so that study advanced recommended For involving population more broad and exploratory effectiveness approach This in term long and at the level different education .

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