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DEVELOPING OF VCDLN-LEARNING THROUGH DCIRV BASED ON AI FOR VIRTUAL REALITY ED-COMM

Deni Darmawan[1]*, Elizabeth Gardere[2], Ence Surahman[3], Cecep Kustandi[4], Khammataliev Dostnazar Omonovich[5], Ubayda Yunusovna Fayzieva[6], Zulfiya Aitbayevna Jumaniyazova[7], Saodat Khamidovna Gayupova[8], Sevara Djasirkulovna Achilova[9], Dilsora Nurali kizi Kayumova[10], Intizor Khujamuratovna Ruzimova[11], Ismigul Kodirovna Sayfullaeva[12], Jenuri[13], Ayung Candra Padmasari[14], Linda Setiawati[15]

[1]Department of Educational Technology, Indonesian University of Education, Jl. Dr. Setiabudi No. 229 Bandung, 40615, Indonesia, Email: deni_darmawan@upi.edu
[2]Université de Bordeaux, France, Email: elizabeth.gardere@u-bordeaux.fr
[3]Department of Educational Technology, State University of Malang, Jl. Cakrawala No. 5, Sumbersari, Lowokwaru District, Malang City, East Java 65145, Indonesia, Email: ence.surahman.fip@um.ac.id
[4]Department of Educational Technology, Jakarta State University, Jl. R. Mangun Muka Raya No. 11, Jakarta 13220, Indonesia, Email: cecep_kustandi@unj.ac.id
[5]Chirchik State Pedagogical University, Uzbekistan, Email: d.khimmataliev@gmail.com
[6]Department of Special Pedagogy, Chirchik State Pedagogical University, Uzbekistan, Email; ubaydafayziyeva@gmail.com
[7]Chirchik State Pedagogical University, Uzbekistan, Email: s.gayupova@cspu.uz
[8]Department of Special Pedagogy, Chirchik State Pedagogical University, Email: zulfiyajumaniyazova9@gmail.com
[9]Department of Special Pedagogy, Chirchik State Pedagogical University, Email: achilovasevara85@gmail.com
[10]Department of Preschool education, Uzbekistan National Pedagogical University named after Nizami, Email: dilsorakayumova@gmail.com
[11]Department of Pedagogy, Urgench State Pedagogical Institute,Email: ruzimovaintizor0@gmail.com
[12]Department of Special Pedagogy, Chirchik State Pedagogical University, Email: omonovanilufar47@gmail.com
[13]Department of MKU, Indonesian University of Education, Jl. Dr. Setiabudi No. 229 Bandung, 40615, Indonesia, Email: jenuri@upi.edu
[14]Postgraduate School of Indonesian University of Education Cibiru Campus, Jl. Dr. Setiabudi No. 229 Bandung, 40615, Indonesia, Email: ayungcandra@upi.edu; dedetriekurniawan@upi.edu
[15]Libirary and Information Science Study Program, Faculty of Education, Indonesian University of Education, Jl. Dr. Setiabudi No. 229 Bandung, 40154, Indonesia, Email: lindasetiawati@upi.edu.

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Corresponding Author: Deni Darmawan (deni_darmawan@upi.edu)

ABSTRACT

The need for communication in education and learning is very urgent in the era of artificial intelligence. In this study, the research team developed VCDLN-Learning through a robotics innovation center to strengthen the Virtual Learning Community (DCIRV). The development method is ADDIE, which has resulted in a process

from needs analysis, design, development, implementation, and evaluation of the resulting product. From DCIRV, a ready-to-use prototype was produced and has been distributed to research target areas in Asia and Europe, especially for the 3D design of the DCIRV main virtual building. Starting with the findings on the redesign and development of the DCIRV prototype for educational communication, expert reviews from Asia and Europe have supported how the AI-based DCIRV for educational communication can provide benefits in augmented and virtual learning services. The impact test or implementation of this research product can predict a significant improvement in educational communication capabilities based on artificial intelligence.

KEYWORDS: DCIRV, VCDLN, Artificial Intelligence, Virtual Reality,Ed-communication.

1. INTRODUCTION

(Langerman & Leung, 2024) Innovation products must not be stopped due to regulations and changes in institutional systems, but innovation products such as VCDLN must continue to provide benefits. In the era of the digitalization communication and pedagogy shift which is more focused on utilizing products and ideas that are currently viral, namely Artificial Intelligence (Langerman and Leung 2024); (Schina et al. 2021). In 2023 VCDLN was able to adjust its framework through the contribution of ideas from experts from Bordeaux University, France. (Darmawan., 2023).

One of the updates in terms of systems, services, and VCDLN content production which already has multi-platform usage has now gathered around 3857 productive educators. The content being managed totals 3827 contents covering all levels of education, this reality of Digital Transformation (Piccoli, Grover, and Rodriguez 2024). Intellectual property in the field of open digital learning education services requires central support from learning resources and a more modern service system. The modernity aspect of the development of digital learning centers is not so much developed but is built based on continental regions, such as Magma Learning which represents European countries, then Liquid Learning (Taylor 2023)which represents the Asia Pacific region, and course, VCDLN (2021) which represents Southeast Asia, Korea and Japan. Thus, the existence of the VCDLN innovation has begun its development by utilizing the advantages of Artificial Intelligence for Human Resources Development (Marr 2023), it will be accommodated in the form of an Innovation Center that applies intelligent Indonesian Robotics engineering. Several studies that will strengthen the background of VCDLN-Robotics with the support of Artificial Intelligence will bring success to the Indonesian University of Education in providing Hybrid Learning services with the strength of the Digital Center Innovation Robotic VCDLN (DICRV) Institute.

By reflecting on institutionalized digital innovation at the international level, it is very important to support the quality of universities, of course, development research in this case must continue to be carried out. As one of the strengths of an international institution like Luquid, it has also developed on the European continent, driven by (Gabella 2021). Named Magma Learning. Of course, it is an international institution that accommodates and manages the products of world innovators. It is time for Indonesia through UPI to be able to develop further through VCDLN. Where the VCDLN of the future has been infused with both systems, digital governance, and the expansion of networking using a framework from Artificial Intelligence. Moreover, VCDLN has 3 years of experience in building extraordinary systems, networks, content, and dissemination, so for the next 4 years, it is targeted to become the strength of DCIRV which has international networking. Based on this background, several objectives of this research include:

1. Redesign and develop the DCIRV prototype for Ed-Comm;
2. Expert Review from Asia, Europe, on the DCIRV Prototype for Ed-Comm;
3. Developing DCIRV Based on AI for Ed-Comm.
4. Implementation Virtual Reality DCIRV for Ed-Comm Through Mobile Technology.

Following the presence of foreign partners from the company PT. Tchain (2020-2022), PT. IKB (2025) as a long-standing partner also includes the Yandex Company from Russia (2023), so this research is also supported by the Laboratory from Bordeaux University (2019-2024) and have been presented at UQAM Canada (2022).

2. LITERATURE REVIEW

As discussed in the introduction above, several innovations have sprung up and are unconsciously able to cultivate "Culture Education Practices". For example, the analysis of (Google, 2020) has so far recorded that 34% of the consultation process in education services is carried out online education (Mc Kinsey & Company. 2020), and the practice of education communication has reached 33% (Al-Gharaibeh 2016).

2.1. Robotics of VCDLN

Robotics is a branch of engineering and computer science that involves the conception, design, manufacture, and operation of robots. The objective of the robotics field is to create intelligent machines that can assist humans in a variety of ways. Robotics can take on several forms. A robot might resemble a human or be in the form of a robotic application, such as robotic process automation, which simulates how humans engage with software to perform repetitive, rules-based tasks (Darmawansah et al. 2023; Smyrnova-Trybulska, Staniek, and Zegzuła 2020; Wang, Coutras, and Zhu 2021). While the field of robotics and exploration of the potential uses and functionality of robots has grown substantially in the 21st century, the idea certainly isn't new(Kinza Yasar 2023). The Robotics work system that will be adopted in this research product leads to the development of a working system for the player robot chatbot

product on IOS for practitioners, educators, and students. Some important elements in the implementation of VCDLN can be analyzed in a flashback regarding several terms and objects or target subjects that we often call and use in educational practice. For example, the terms software, hardware, brain ware, and environmental ware. Likewise, in the analysis, a new concept or model may soon be put into practice in the paradigm of system service implementation and education and learning communication strategy which the author named VCDLN-Learning Based on AI. This purpose was supported (Mc Kinsey & Company., 2020). Where the results of the analysis of these elements can be seen in the following chart. There are several important components in developing a robotics system in the VCDLN speed service flow which is integrated with many IOS mobile phone systems (Kong and Wang 2019; Wang et al. 2021). As a stage for improving the Mobile Learning Blended service, this product was the main stage for 3 years before marketing with partners to reach various parties and regions in Indonesia.

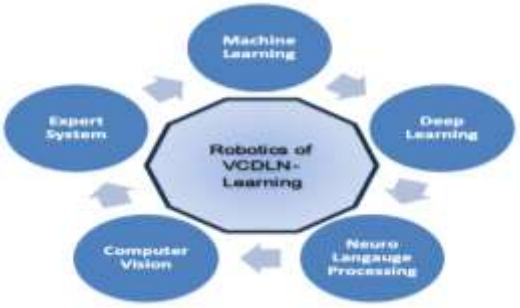

Figure 1: Element of Robotic VCDLN Based on Artificial Intelligence (AI).

Source: Result of Indonesian Collaborative Research, 2025.

2.2. Artificial Intelligence on Robotics Framework

The concept of what defines artificial intelligence (AI) has changed over time, but at its core, it has always been the idea of creating machines capable of thinking like humans (Marr 2023). AI can uniquely interpret the world around us and use the information we take to make changes. So, AI can help humans do this more efficiently, and AI can be thought of as simulating the capacity for abstract, creative, and deductive thinking, especially the ability to learn using digital, binary computer logic(Marr 2023). Thus, the application of AI in this research will relate to how the database system, access, and selection of appropriate learning content for educators and students are assisted quickly by AI (Darmawan. 2023; Gocen and Aydemir 2020; Tan, Leibo, and Poggio 2012). Where the form of application that will be developed is in the form of Mobile IOS to access content from online databases http://vcdln-tvupi.com or http://vcdlnlearning.com.

Generalized AI goes a little further – to perform a complete simulation of the human brain would require a more complete understanding of the organ than we currently have and more computing power than is generally available to researchers. But that probably won't be for long, considering the speed at which computer technology is developing. A new generation of computer chip technology known as neuromorphic processors is being designed to run brain simulator code more efficiently. Systems such as IBM's Watson cognitive computing platform (Marr 2023), use high-level simulations of human neurological processes to perform an ever-expanding variety of tasks without being specifically taught how to do them. In its application for this research, it will be used to create a simulator.

2.3. Roadmap of Digital Center Innovation Robotics of VCDLN (DCIRV)

Where a form of VCDLN implementation in the context of the realization of this new normal condition, will allow Mobile Blended Learning based on IOS to be carried out. Of course, this Blended Learning was regulated 3 years ago in the Regulation of the Directorate of Higher Education Research and Technology No. 51 of 2020. Thus the New Normal regulation is an indirect form of education and learning policies with face-to-face and Distance Learning with digital systems, especially through Mobile IOS. As in the past 10 months, we feel that the practice of education is building a virtual network for the future needed for the Digital Central Innovation VCDLN in Central UPI and Kampus Cibiru. Researchers remember from one of the studies regarding the level of digital skills or literacy owned by the millennial generation or the Z-generation, where they were able to design digital learning information system lines in several universities (Darmawan, D, 2021). If analyzed from the Regulation from Ministry Education and Culture of Republic Indonesia as policy regarding the targets of implementing full online long-distance learning at that time it is confirmed that it will produce 80% (Regulation from Ministry Education and Culture of Republic Indonesia No.51 of 2018). Thus the VCDLN concept will become a superior platform and trend for all parties related to the implementation of education and learning in a "New Normal" condition. This innovation is conducted to

Regulation Letter Number 15 of 2020 Concerning Guidelines for Organizing Learning from Home in an Emergency Period of the Spread of Corona Virus Disease (COVID-19) through conduct with the (Ministry of Education and Culture, 2020).

Regulation No. 51/2018, in the Distance Learning & Online Learning Milestones section in Indonesia. When the initiators of the VCDLN Community in remote areas included educators who did face-to-face in the context of learning communication through mobile digital television. Where the strength of the content is presented through access to an ICT center that is built and provided by the educational television platform, it will be cheaper to finance. The following is an illustration of the Ecosystem Multiplatform Super-App VCDLN-TVUPI (Darmawan., 2023) as the Roadmap Scheme for the Teacher Training Profession in the context of VCDLN through DCIRV Mobile of IOS as the core model in this research. In the continuation of research oriented towards innovative products since TVUPI, LCJ- TVUPI, VCDLN-TVUPI, VCDLN-Learning, and VCDLN-Learning Android from 2016 to 2023, researchers have contributed a lot to strategies for equal distribution of educational services, equal use and service of content products and systems VCDLN-Learning reaches all corners of the archipelago.

3. RESEARCH METHODOLOGY

3.1. Research Method

The research method is used as a plan for how a study is carried out. To be able to answer all the research problem formulations, a Research & Development (R&D) research or research methodology is often called. Research and development methods are research methods used to produce certain products and test the effectiveness of these products (Creswell, 2015). This research will be done with a mixed-method procedure (Brannen, 2005) to evaluate all implementation programs, however, there are some additions and grouping that make it as seen in the figure below.

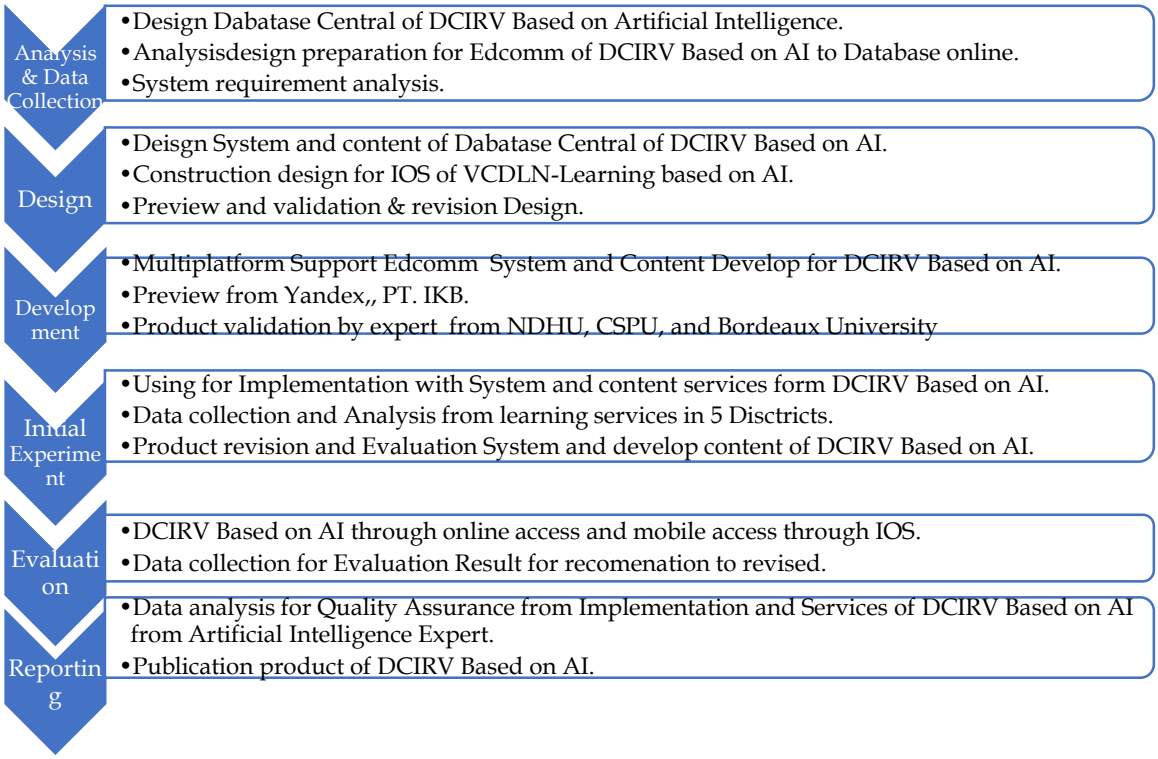

Figure 2: Research Design for Developing of VCDLN-Learning Through DCIRV Based on AI for Virtual Reality Ed-Comm.
Source : Result of Indonesian Collaborative Research, 2025.

3.2. Research Instrument

The research instruments used in this study are questionnaires and tests. The purpose of this questionnaire is to get feedback and opinions from the research subject will be collected through FGD and the expert, in terms of user satisfaction and effectiveness of "During System, Content, and prototype of DCIRV and Manual using guide for all educator, student and practices." Research Subject.

The study was conducted with research subjects divided into two groups, namely educators, and expert teams. The expert team is an expert in the field of multimedia, education, and Artificial Intelligence from MICA Bordeaux University-France, the University of Mc. Gill Montreal Canada, NDHU University Taiwan, CSPU Uzbekistan, and Kitakyushu University and Educators from UPI Regional Cibiru. Sample selection is done by purposive sampling. (Creswell 2015) suggests that Qualitative researchers can use existing Ed-Comm for distance learning VCDLN-Learning Based on Artificial Intelligence through Digital Centre Innovation of Robotics VCDLN. For analysis, The quantitative data will be using the regression analytics (Kwon, Lee, and Kim 2017; Lee 2001).

3.3. Data Analysis

Qualitative data analysis derived from the ADDIE method uses the approach of (Huberman. 1992), specifically for qualitative data from expert review results on DCIRV products constructed in 3D Virtual form. As for quantitative data, namely from the Implementation process which is part of the ADDIE stage, the data obtained is analyzed using simple linear regression (Ding 2006; Kraemer and Blasey 2017)with the following formula:

$\hat{Y}=a+bx$

Information: $\hat{Y}$ = Ed-Comm
a = Intercept
x = Virtual Reality DCIRV

4. RESULT AND DISCUSSION

4.1. Redesign and develop the (DCIRV) prototype for Ed-Comm

The redesign process was carried out by developing a flowchart design that illustrates how DCIRV at the UPI Cibiru Campus was developed systematically, by following the flow as follows this figure 3.

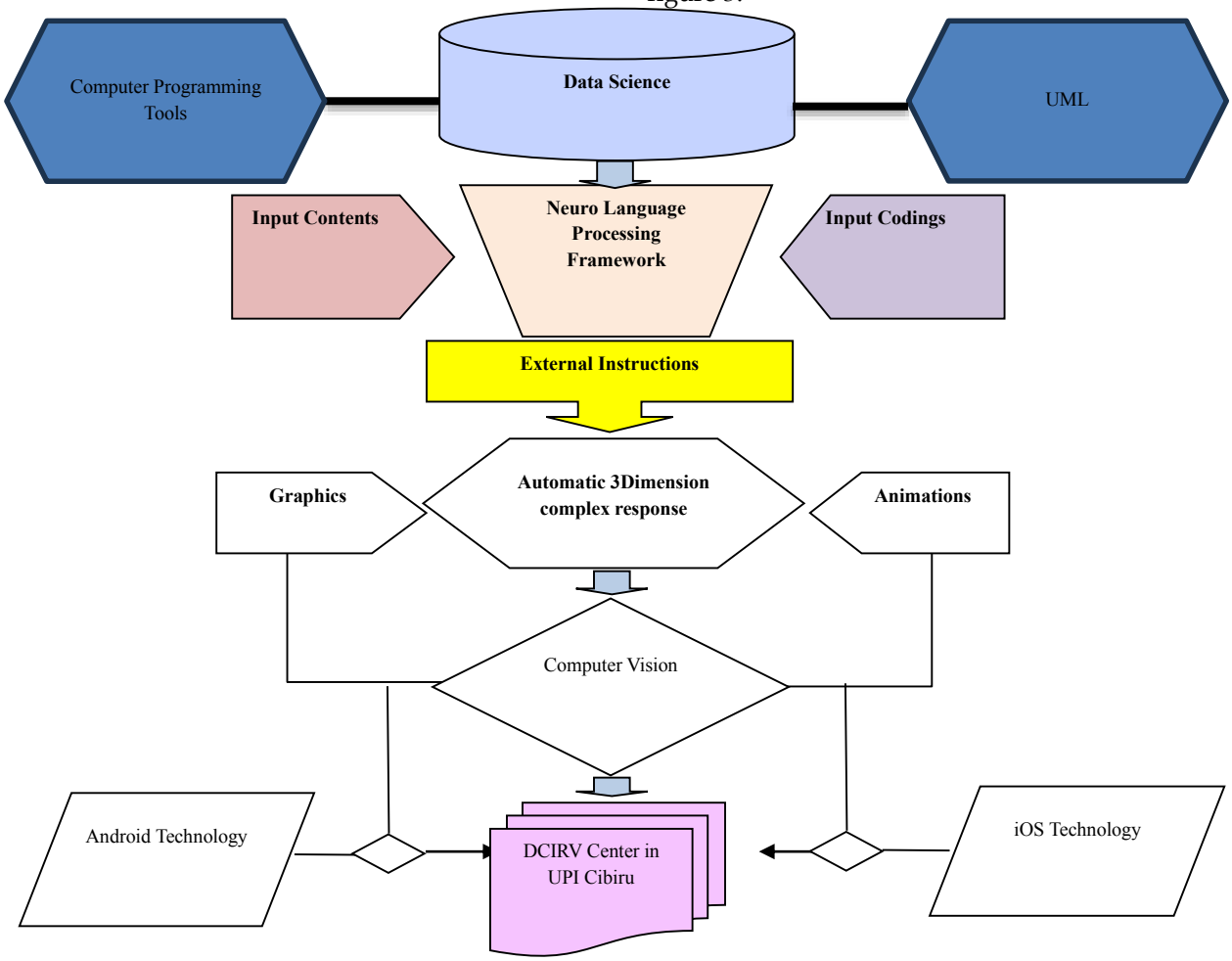

Figure 3: Multi-Platform Android & IOS Support Development VCDLN through Artificial Intelligence Framework for Ed-Comm Model.

From the flow chart on figure 3, it can be seen that the Analysis process of the role of the AI framework

is involved in the input and coding stages for the production of automatic responses by Neuro Language Processing (NLP). Furthermore, to provide a three-dimensional effect that bridges Virtual Reality and Augmented Reality, adequate graphic design and animation are used. In the next stage, the AI framework, namely Computer Vision, can be realized. As for the final stage of DCIRV innovation for access, it utilizes the role of Android and iOS mobile technology, this flow chart is adapted from research findings from (Lamovšek et al. 2024)

4.2. Expert Review from Asia, Europe, on the DCIRV Prototype for Ed-Comm

Several perspectives conveyed by experts from Bordeaux, CSPU, and Kitakyushu regarding the DCIRV product can be seen in several opinions conveyed in the FGD. The following are some inputs for revision and motivation, CSPU Uzbekistan, University Bordeaux, Kitakyushu University, explained that the DCIRV product as the center of Robotics VCDLN is very helpful for students who have difficulty accessing universities, (Kodama Yayoi, 2025).

Furthermore, Miyake Hiroyoke explained that the product in the form of this method is interesting for future university innovation because students are the moderators, it will make it easier to learn, this DCIRV prototype will promote and communicate with universities, then the production of VCDLN content will make it easier for anyone interested to learn.

Likewise, Rachman (2025) explained that the application of AI for users makes it easy to learn and get information, but educators must learn a lot about AI so that it can become a superior innovation in Asia and the world. Furthermore, Bordeaux University focuses on providing an appreciation for all DCIRV development indicators to facilitate the VCDLN Robotics system and production, but some things still need to be improved, namely regarding the latest aspects of the AI industry.

This research product will be an asset for the transformation of educational services with the power of Communication Technology between related parties (Senyo et al. 2024); (Oberländer et al. 2024).

4.3. Developing DCIRV Based on AI for Ed-Comm

As a product of the DCIRV research conducted in the three year as a series of development and expansion of VCDLN research series, to adopt the development of AI technology, an effort was made to produce a Virtual Assistant Robot (RAV) until EDUBOT. Where in its development it was carried out together with industry partners from PT. IKB Jakarta Artificial Intelligence Installation, as researched by (Darmawan 2020a, 2020b). From the results of the AI development for the VCDLN Robot (Anđić et al. 2024; Cox 2021), it was integrated with two mobile phone technologies, namely Android and iOS. However, in 2024-2025, the technology that will be developed further is iOS technology. The development stages include: (a) DCIRV Virtual Reality Creation Stages; (b) DCIRV Virtual Reality Flowchart; (c) DCIRV Virtual Reality 2D Sketch Design; (d) DCIRV Virtual Reality 3D Design; (e) DCIRV Virtual Reality Implementation.

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4.3.2. Stages of Making DCIRV Virtual Reality

Here is the first stage flowchart which contains the creation of the DCIRV virtual reality application. Here is the first stage flowchart which contains the creation of the DCIRV virtual reality application (Moritz and Youn 2022).

At this stage is the running stage of the DCIRV virtual reality application that was created. The flowchart in Figure 4 below consists of a show area that will display the initial display of the virtual reality space.

Then on the display, there is a display on how to use the application, a display of information and communication about the application, and a start button to run the DCIRV virtual reality application (Moritz and Youn 2022).(Al-Gharaibeh 2016;

Darmawan. 2023.

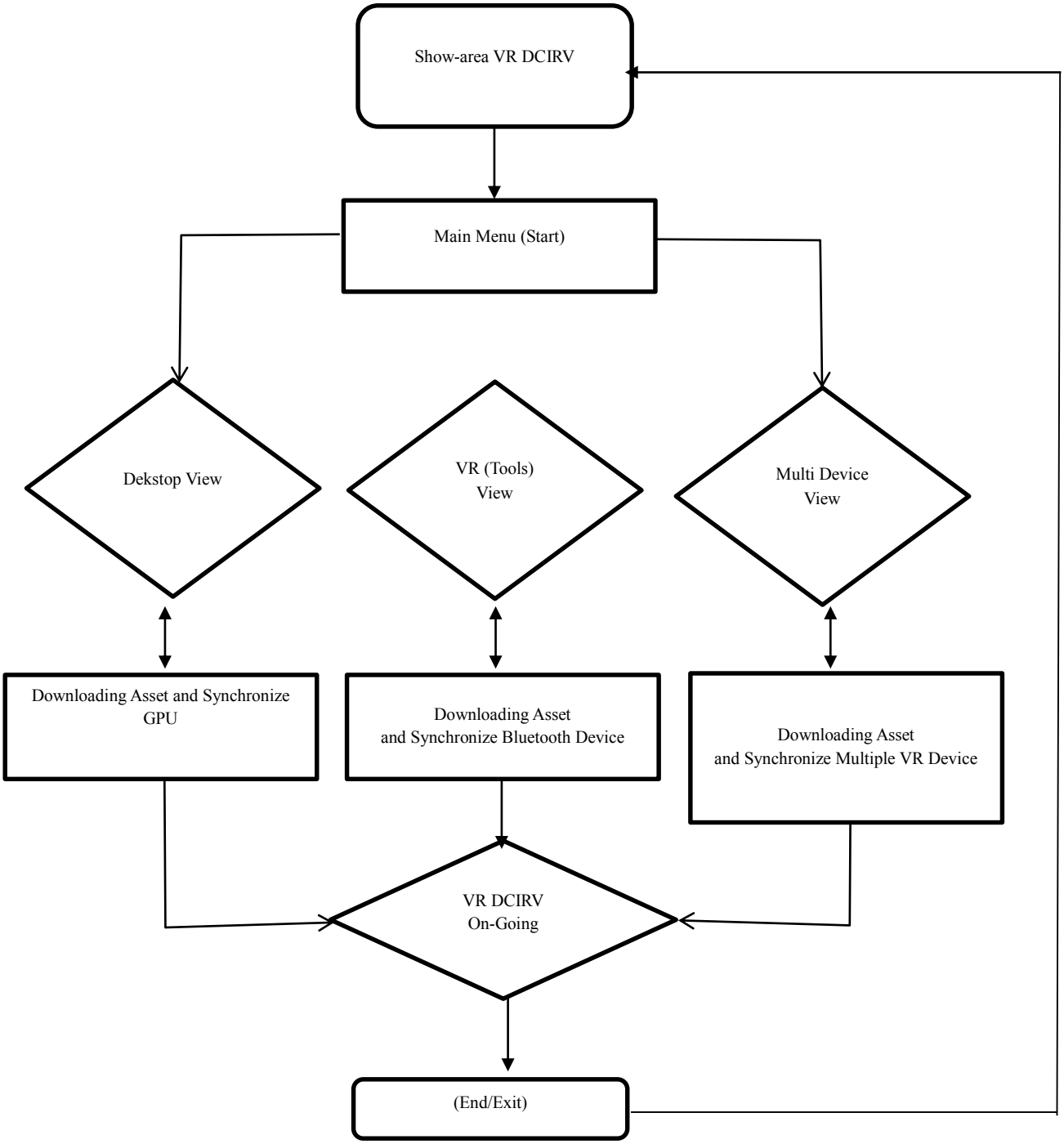

Figure 4. DCIRV Virtual Reality Application Flow chart.
Source: Result of Indonesian Collaborative Research, 2025.

4.3.3. DCIRV 3D Virtual Reality Design.

This SketchUp 2024 visualization, will display images that have been designed in the sketch design, namely the main gate area, the entrance and exit area, the information center area, the parking area, the main DCIRV building area, and the workshop area. In this 3D design visualization, virtual visitors are expected to be able to get a stronger real impression, especially in studying several VCDLN-Learning contents (Onime and Abiona 2016). The visualization can be seen in the image on the side, namely image 10. 3D Design Plan for the Main Gate Area (Kwon et al. 2017; Onime and Abiona 2016; Stern, Zofi, and Kaspi 2011; Teplá, Teplý, and Šmejkal 2022). After developing 3D for the main gate, continue with the 3D design for the Information Center Area as seen in

image, next develop the 3D design for the DCIRV Main Building, as seen in figure 5. Likewise with the 3D for the virtual Workshop Area as seen in figure 5 bellow.

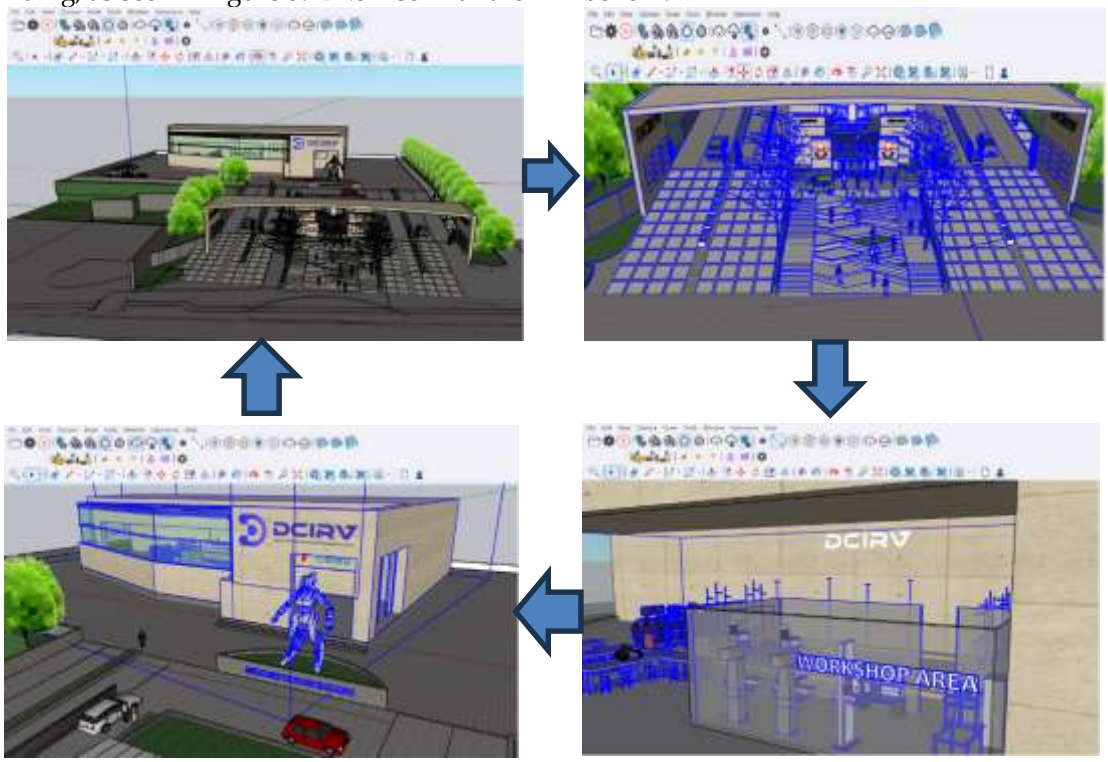

Figure 5: Steps Developing of 3D Design of DCIRV Main Virtual Building Area
Resource: Result of Indonesian Collaborative Research, 2025.

4.4. Implementation Virtual Reality DCIRV for Ed-Comm Through Mobile Technology

To integrate a 3D DCIRV model from SketchUp into SimLab VR, follow these quick steps:

1. Export from SketchUp: Open the model in SketchUp, then select File > Export > 3D Model. Select a supported format such as FBX or OBJ, then save the file.
2. Open SimLab VR: Launch the SimLab VR application on your computer.
3. Import Model: In SimLab VR, select File > Import, then select the file format exported from SketchUp. Navigate to the saved file and click Open.
4. Customize Model: After importing, adjust the appearance, materials, and scale of the model as needed in SimLab VR.
5. Save and Publish: Save the project and publish it if necessary.

The VR function in the SimLab VR application is very effective in several aspects.:

1. Realistic Visualization: SimLab VR allows you to view and interact with 3D models in a virtual environment that is very close to reality. This helps in evaluating designs with a more immersive and realistic perspective.
2. Interaction and Navigation: Can intuitively explore models, such as walking, rotating, and viewing from different angles. This is very useful for understanding scale and details that may be difficult to see on a 2D screen.
3. Presentation and Collaboration: VR facilitates the presentation of designs to clients or teams in a more immersive way. This allows for more effective collaboration as all participants can "step into" the model and provide direct feedback.
4. Adjustments and Revisions: Can easily make adjustments to the model in a VR environment, seeing how changes will affect the overall design in real-time.
5. User Experience: Interactive features such as object selection, material changes, and model manipulation allow for a more dynamic and engaging user experience.

Overall, the VR functionality in SimLab VR enhances the way you interact with and evaluate 3D models, making it a very useful tool for design, presentation, and collaboration, especially in this DCIRV virtual exploration area.

So by using the steps above, the finished DCIRV

virtual reality design results will be displayed as follows on figure 6 bell

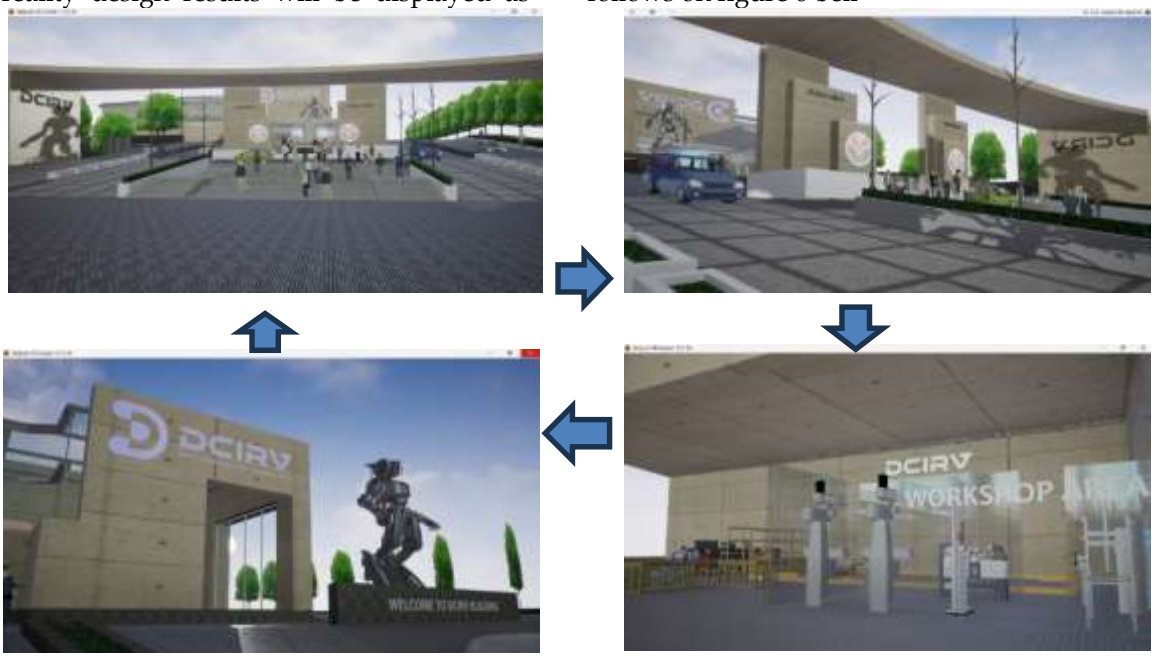

Figure 6: Steps Developing of 3D Design of DCIRV Main Virtual Building Area
Source: Result of Indonesian Collaborative Research, 2025

As a real product of this finding, a module was developed from both mobile phone technologies (Fojtik 2017; Gábor and Péter 2015), so that users can utilize it through DCIRV. This Virtual Reality development product has been tested on some experts and users in the Asian region, in addition to being reviewed by experts from Bordeaux, Kitakyushu, and CSPU. Of course, the results of this assessment are very positive when viewed from the aspects of innovation, communication, and networking as well as ease of access to information needed by users. From the results of the development, the researcher then conducted an impact analysis of the use of Android and IOS technology to access VCDLN in the context of DCIRV to users according to 3 times of product introduction to the public (Smyrnova-Trybulska et al. 2020) . The following are the results of the analysis, as shown in Figure 7 below.

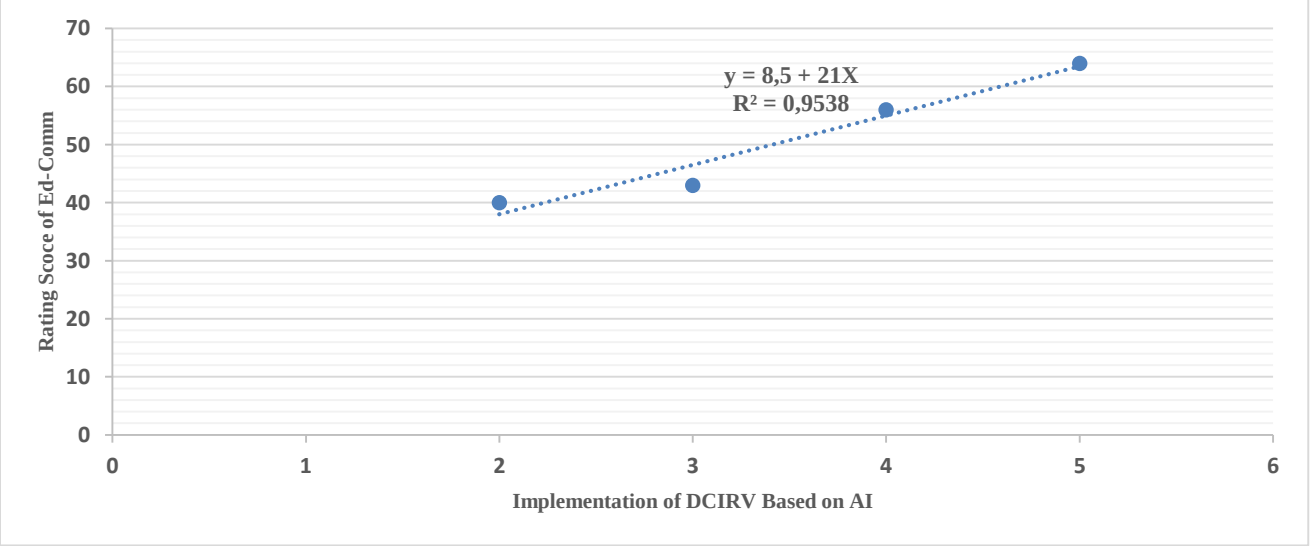

Figure 7: Increase in poll scores from users about DCIRV Based on AI for Ed-Comm.
Source : Result of Indonesian Collaborative Research, 2025.

From the regression line equation above, the initial score of the strength of VCDLN Robotics

through DCIRV was obtained as 21 points, then when this research product was tested four times, the score continued to increase to the highest score from the user assessment of 64. So the linear regression line equation y ̂=8,5+21X can be used to predict the increase in positive scores from the influence of robotics VCDLN through DCIRV which is tested continuously until perfect, then it will increase the number of users over time (Anđić et al. 2024; Erdogan et al. 2023).

5. CONCLUSION

Redesign and develop the Digital Central Innovation for Robotics VCDLN (DCIRV) prototype, developed through flowgraph referring to the waterfall theory for Ed-comm. The research product in the form of a Robotics VCDLN (DCIRV) Prototype has been reviewed by several experts from Asian representatives from Kitakyushu and CSPU, and from Europe represented by University of Bordeaux, with positive results that the research product is very innovative, a source of information, and easy to communicate for users.

The process of Developing an AI-based Digital Central Innovation for Robotics VCDLN (DCIRV) manual was developed starting from the design planning stage, design implementation, and design evaluation using 3D equipped with Virtual Reality technology that Android and iOS mobile technology can access. Where from the prediction measurement, an increase in scores can be obtained from users of DCIRV based on AI research products through DCIRV according to 4 trials.

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