



# Conceptual Model of Citizenship Learning Projects Based on Data Literacy in Citizenship Education Course

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**Abstract.** Data literacy capabilities in the 4.0 era can be developed through the learning process using citizenship learning projects. This study aims to develop a data literacy-based learning project model to improve the competence of student citizenship attitudes in the Institutional Citizenship Education course. The research approach used is qualitative with the type of literature study research. The research is divided into three stages, namely the preliminary study stage, the preparation of conceptual models design, and verification of conceptual models. The results showed that the learning model was carried out through a combination of citizenship learning projects with data literacy. The learning process is based on the stages of identifying problems, collecting data, choosing problems, data management, gathering information, evaluating data, developing class portfolios with data applications, presentations using virtual media, and reflection.

**Keywords:** Civic education · Citizenship Learning Project · Citizenship attitude · Data literacy

## 1 Introduction

The era of the Industrial Revolution 4.0, commonly called the 4.0 era in the 21st century was an era of the resurrection of the power of technology that penetrated various kinds of human life. Inevitably, technology is now a primary need where every human being is very dependent on its existence. Therefore, the preparation of a generation that can adjust to the challenges of utilizing the 4.0 era as a gift and grace from God Almighty, not as a time bomb that threatens the existence of human life at any time.

For example, in the field of manufacturing for example, Lee et al. [1] explains that era 4.0 is inseparable from the concept of digitalization. This digitalization is supported from four main factors, namely first, the increase in data volume, supported by computerization and connectivity. The volume of data in question is now better known as “big data”, which will make it easier for every human being to interact with the technology he uses, because all data is stored in storage with a large capacity. Second, with the emergence of an increase in data and computerization volume, it must be supported by

the ability to analyze data. Third, human interaction with machines. Fourth, changes from digitalization into physical forms such as robot technology and so on.

One of the challenges of the Industrial Era 4.0 according to Hecklau et al. [2] that in terms of social challenges, namely the growth of process complexity which includes technical skills, process understanding, learning motivation, ambiguity tolerance, decision making, problem solving, and analytical skills.

These three skills are predicted to be very necessary skills in the future or in the industrial era 4.0. Data literacy is directed at the purpose of improving the ability to read, analyze, and use information in the digital world (big data), technological literacy aims to provide understanding of the workings of machines and technology applications, and human literacy is directed at increasing the ability to communicate and mastery of design science [3]. The new literacy given is expected to create competitive graduates by perfecting the old literacy movement which only focuses on improving the ability to read, write, and mathematics.

Drucker [4] predicts that higher education will experience a crisis. In the future there will be many changes in how to teach and the learning process. Content of course, the role of lecturers and students will continue to experience dynamics, he also describes the shift towards the era of the knowledge society. In this type of society, knowledge, as well as capability for learning, and investment action for the purpose of building intellectual bases is a rapid change in society and therefore humans as knowledge workers become the main actors.

Education as a system of intelligence of the nation's children is currently faced with various globalization challenges. Various learning problems, especially those concerning appropriate learning methods for students, need to be sought the best middle way as a solution. In line with the challenges of global life, teachers' roles and responsibilities in the future will be more complex, so that teachers are required to make various improvements and adjustments to the competency rulers [5].

Based on the explanation above, there is a relationship between the 4.0 era, education, and literacy, especially the loss of citizenship data. Where era 4.0 is part of the concept of development and changing times, education is a forum in developing science and knowledge, while literacy is the ability that must be possessed by every citizen to be able to read, analyze, and utilize the 4.0 era. Citizenship data literacy is needed because every citizen in the 4.0 era must be able to be literate against data whose basis is the concept of citizenship to become a democratic citizen and participate in building a nation and state (civic action). Therefore, this connection needs to be examined, especially in the learning process in the development of a data literacy -based learning project to improve the competency of student attitudes in the Public Civic Education of Ahmad Dahlan University.

## 2 Methodology of Research

The research approach used is qualitative with the type of literature study research. The qualitative approach provides space for researchers to analyze more deeply how the data literacy -based learning project model can be put together into a complete model. Literature study research provides a theoretical in -depth analysis in developing data

literacy as an alternative for learning citizenship education, carried out by gathering scientific information or studies about the main research or by gathering literature, or studies aimed at solving a problem, which is essentially based on studies critical and in-depth to relevant literature.

The object in this study was a data literacy -based learning project in the Citizenship Education course at Ahmad Dahlan University. The data used comes from textbooks, journals, scientific articles, and literature reviews that contain the concepts under study.

Data analysis was carried out in advance with the help of successive research results assessed from the most relevant, most relevant, and quite relevant. Second, first read the abstract from each study to assess whether the issue raised is consistent with research. Third, consider important and essential parts for research problems. Fourth, make notes, quotations, or information arranged systematically.

### **3 Results of Research**

#### **3.1 Citizenship Education as a Public Course and Institutional Course at Universitas Ahmad Dahlan**

At Ahmad Dahlan University, the Ministry of Education Education course is a compulsory course that must be present in the curriculum of each S1 study program. Civics courses are included in the institutional courses based on the Decree of the Rector of Ahmad Dahlan University Number 267 of 2019 concerning Institutional Course which stipulates that the institutional curriculum of Ahmad Dahlan University contains the Citizenship Education course.

Civics or citizenship is related to the status of a person or individual in an organization called a nation-state. The status is regulated by the law made by the people in the country through a process depending on the government system used. The law determines the rights, responsibilities, and duties as citizens, so the word civics or citizenship is a pattern of mutual relations between the government and those who are governed and both parties are bound by law or laws that must be obeyed together. Butts [6] explains that the origin of citizenship ideas is based on membership in the political community regulated by man-made laws rather than based on membership in families or ethnicities, kinship, religion, ethnic background, or other inheritance status.

Furthermore, Winataputra [7] strengthened the context of the Civics by explaining that PKN is a subject that contains governance taught in schools, where in a democratic government, citizens should carry out their rights and obligations with full responsibility. This confirms that PKN is a way of forming relations between countries and their citizens, and vice versa.

#### **3.2 Conceptual Model of Citizenship Learning Projects Based on Data Literacy to Increase Citizenship Attitudes in Institutional Citizenship Education Course**

The main thing that must be analyzed in this study is to connect citizenship learning projects consisting of six steps with data literacy. This connection, can be explained as follows:

#### Step I: Identification of Problems in the Community.

Problem identification is inseparable from the search for various problems that have occurred, are happening, or allows one day to be a problem. In this case data literacy is focused on data introduction, namely the selection of data sources that will be used as a data collection basis. After that, then the data collection process, data discovery and collection and evaluating and ensuring quality of data and source.

#### Step II: Choosing a Problem for Learning.

Choosing a problem is a step after he identifies the problem until a problem really arises. In this case data literacy is focused on data management, data curation, the process of changing data forms, data Manipulation, data preservation, metadata creation and use, data organization.

#### Step III: Gathering Information.

The information collection process basically began from steps 1 and 2, therefore, at this stage data literacy is focused on data evaluation, which consists of identifying data use problems, analyzing fundamental data.

#### Step IV: Portfolio Process.

The portfolio process is the final stage in making project citizens. At this stage, data literacy is focused on data applications, which consists of data sharing, decision making in accordance with existing data, evaluating data management practices that have potential adverse impacts for people and the community, in the context of collecting, dividing, and using data (data ethics), evaluating decisions based on data, data citation, and making media to be presented in step V.

#### Step V: Oral presentation/show.

Project Citizen presentations are carried out using virtual media by utilizing computer tools and internet networks.

#### Step VI: Reflection.

Reflection activities are carried out in the form of written and oral assessment by lecturers for students and by students for lecturers, which aims to express the impression of construction, messages, hopes, and criticism of the learning process.

## 4 Discussion

### 4.1 Project Citizen as a Citizenship Learning Project Model

Talking about education, is inseparable from the success of the learning process that can develop hard skills and soft skills. Trilling & Fadel [8] explains that there are three main skills that must be possessed in the 21st century context. These skills are, 1) learning and innovation skills are related to some of the skills that must be possessed among them skills relating to critical thinking skills and abilities Solving masalah, the ability to communicate and collaborate, and the ability to be creative and innovate. 2) The focus of 21st century learning is the skills in mastering the media, information, and technology (ICT) among skills relating to the use of literacy, raising media and utilization of information and communications technology (ICT). And 3) is life and career, among skills relating to career life skills in a flexible and adaptive manner, provided and independently, able to interact social and between cultural, productive and accountability as well as the spirit of leadership and a sense of responsibility.

Liu et al. [9] explains that learning activities with media or visual tools will help the brain to work so that memory will last long enough. This is in accordance with the Project Citizen model, because students are required to make products in the form of portfolios that contain information that can solve problems that are happening. The portfolio is made in a cardboard box that is affixed with various sources of information, both photos, graphics and others that can make it easier for other students to remember. Furthermore Long & Carlson [10] explained that the activity of mapping an idea in the form of a portfolio can help in achieving a greater understanding of students who only use ordinary or traditional recording strategies and have controls in forming more meaningful relationships with content which is presented in the form of a portfolio so that it can understand the concept well.

Project Citizen began with an institution in the United States California named Center for Civic Education (CIVICED). The main purpose of the Citizen project developed by this institution [11] is to help students increase their capacity to participate in competent and responsible in the American political system. In addition to the requirements mentioned above, this participation requires that citizens/residents have the capacity to track, or monitor, what is being done by their government and to influence them in things that their concerns are. Therefore, Project Citizen introduces students to and educates them in the methods and procedures used in our government processes. The purpose of this program is to develop student commitment for active citizenship and government by: Providing knowledge and teaching the skills needed for effective participation; provide practical experience designed to foster a sense of competence and efficacy; and develop an understanding of the importance of citizen participation.

Project Citizen in Medina-Jerez et al. [12] seeks to encourage students to work collaboratively to identify what they believe to be a community problem. Through research and interviews with community members, students determine the scope of the problem and whether others also have their concern. Considering the problems from various perspectives allows students to formulate solutions. Students then choose one or a combination of this solution to be presented as a public policy proposal and their action plans before the evaluator panel, policy makers, and members of educators for democracy, local non-profit organizations, and on several occasions, to students from public schools in schools in Wyoming through a digital video conference. They concluded with oral and graphical presentations for educators, local authorities, and other interested parties through the appearance of four panels and the accompanying portfolio notebook.

Furthermore, Fry & Bentahar [13] confirms the importance of special learning experiences to help students develop the knowledge, skills, and citizenship disposition in citizenship programs such as project citizens.

Center for Civic Education [11] explains that there are six steps in making Project Citizen. The six steps are as follows:

1. Step I: Identification of Problems in the Community
2. Step II: Choosing a Problem for Learning
3. Step III: Gathering Information
4. Step IV: Portfolio Process
5. Step V: Presentation/Oral Performance
6. Step VI: Reflection

## 4.2 Data Literacy as 21st Century Skills

21st century skills are skills that include high -level thinking of in -depth learning outcomes and communication skills. The same thing was also conveyed by Saavendra & Opfer [14] defines 21st century skills in four categories, including: (1) Ways of Thinking: Creativity and innovation, Critical Thinking, Problem Solving, Decision Making, and Learning How to Learn (Metacognition), (2) How it works: communication and cooperation in groups, (3) tools for work: general knowledge and literacy of information communication technology (ICT), (4) Life as citizens: citizenship, life and career, and personal and social responsibility, including cultural awareness and competence.

Still with the concept of 21st century skills, characteristics in the 21st century, thinking skills spells are growing, in the 21st century competencies or skills that must be there are at least four learning competencies that must be mastered, namely high understanding skills, critical thinking skills, collaboration and communication skills and communicate. The four 21st century competencies were subsequently developed optimally through multilateral skills. Therefore, the 21st century learning must always be oriented to the achievement of competencies needed by the 21st century using the support of multiiletis skills.

Regarding data literacy, Storksdieck [15] explains that data literacy refers to knowledge of sources, validity, and reliability of the data itself. This means that every citizen must be able to see data based on three main keys, as follows:

1. Data source. This data source talks about where and from whom from whom the data was taken. This is important to know because the data with the problems to be examined must be appropriate.
2. Data validity. The validity of the data speaking about the validity of the data obtained, do not let the data obtained is invalid or from an invalid source. If this data is not ashamed, then the interpretation and decision making of this data is also invalid or doubtful.
3. Data reliability. The reliability of this data explains whether the data is appropriate or not with the problems to be examined. Even though it is valid, it is not in accordance with the problems to be studied, the interpretation and decision making of the data will be wrong. So, it is possible wrong in providing solutions to the problem.

Data classification based on this source, used as a basis for research by taking only three types of sources, namely unstructured data (audio, video), social media data (blogs, tweets, social networks), and web data.

Data literacy skills and competencies as conveyed by Guler [16] there are five aspects. The five aspects are as follows.

1. Introduction to Data: Understanding data.
2. Data Collection
  - a. data discovery and collection
  - b. evaluating and ensuring quality of data and source
3. Data Management
  - a. data curation
  - b. The process of changing data forms (data conversion: from format to format)

- c. depiction of the process of changing data structures to make it easier to read (data manipulation)
  - d. Ensure that digital data that is stored now can be read and interpreted (data preservation)
  - e. manufacture and use of metadata (metadata creation and use)
  - f. data organization
4. Data Evaluation
- a. Identifying the problem of data use (identifying problems of using data)
  - b. Analyze basic data (basic data analysis)
  - c. interpretation of unwanted data/data (data interpretation/understanding data)
  - d. Change a large and small data collection to visuals, making it easier to understand (data visualization)
  - e. Present data (presenting data)
  - f. Decision Making Process from Data Decision Making)
5. Data Application
- a. Data sharing
  - b. decision making in accordance with existing data (data culture)
  - c. Evaluate data management practices that have potential adverse impacts for people and society, in the context of collecting, division, and data use (data ethics)
  - d. Evaluate decisions based on data.
  - e. Data citation

## 5 Citizenship Attitude as Part of Citizenship Competency

Regarding citizenship competencies that must be possessed by every citizen in the scope of a democratic state, one of which is the attitude of citizenship according to Patrick [17] detailed as follows.

The virtue/virtue of the character of democratic citizenship (Civic Dispositions).

1. Promoting the public welfare/goodness of the community
2. Recognize everyone's moral and dignity equality.
3. Respect and protect the rights of each person in an equivalent.
4. Participate responsibly and effectively in political life and citizenship.
5. Take the responsibility of the government.
6. Take care of yourself by carrying out the virtue of citizenship
7. Support and maintain the principles and practices of democracy.

Citizenship attitude is very important to be owned by every citizen with a democratic government system. This is because the synergy between the state as a forum, the government as the executor of the State, and citizens as the authorities of the mandate of power, will run well.

## 6 Conclusion

Conceptual model project learning citizenship based on data literacy to improve student citizenship attitudes is carried out through five stages of project citizen and five stages of data literacy competencies. Project Citizen and how the steps are, so basically this

model can run well if there is a data excavation and facts in the field which then the data and facts are processed, analyzed, interpreted, then the best solution design is made from the problems contained in the data and This fact.

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