

Using the New Teaching Method to Improve the Agricultural Literacy for College Students

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Abstract

The shortage of graduates engaged in agriculture in Taiwan is related to the lack of interest in agriculture. Improving agricultural literacy can promote opportunities for students to examine the field to table process of their food, explore careers within agriculture, and increase awareness of future related jobs. Agricultural literacy is the comprehensive ability of the people towards agriculture-related knowledge, skills, and attitudes. Its concept is complex and diverse, and it continues to grow with social changes and occupational needs. For this reason, the purpose of this research is to present an updated approach addressing different aspects of learning to promote agriculture literacy. The research focused on using the debate teaching method to improve the agricultural literacy of the student participants at Chung Hsing University in Taiwan. The results of the research show that the British Parliamentary Style (BPS) debate teaching method can effectively improve students' agricultural literacy. Students are interested in the teacher's use of British Parliamentary Style (BPS) debate teaching strategies, and feel that this teaching method allows students to focus on the learning process and achieve good learning results.

Keywords: Agriculture literacy, British Parliamentary Style (BPS) debate

1. Introduction

In recent years, affected by factors such as climate change, the Covid-19 epidemic, and the war between Russia and Ukraine, socio-ecological system issues have reflected emotionally charged actions related to people's livelihood, such as agriculture and diet. Consumption behavior and ignorance of food supply chains have also strained food security concepts that are

relatively unfamiliar to the general public, such as food self-sufficiency rate, etc. In turn, falsities of the food production system have begun to enter consumers' daily life through various channels. To the general public, agriculture may only mean farming and ranching or similar activities.

According to the position paper Education 2030 (OECD, 2018) young people will need the following competencies to thrive and shape their world: communication, critical thinking, collaboration, creativity, and reflection. It is now widely approved that successful education is more than a mere presentation and practice of pieces of information and it is affected by numerous factors (Nguyen, Warren & Fehring, 2014). To increase agricultural literacy, it is crucial not only to have learning outcomes, but also to have a framework to successfully implement the outcome within an educational environment (Roberts and Ball, 2009).

When we use disciplinary literacy to talk about agriculture we fail to effectively communicate with the public; because the message is not understood. Disciplinary literacy is specialized "knowledge and abilities possessed by those who create, communicate and use knowledge within the disciplines" (Shanahan & Shanahan, 2012). Based on Food and Agricultural Literacy, Taiwan proposes the conceptual framework and learning content of food and agricultural education, including three aspects of "agricultural production and environment", "food health and consumption", and "food life and culture". Likewise, "Agricultural Production and Safety", "Agriculture and Environment", "Diet and Health", "Diet Consumption and Lifestyle", "Food Culture", "Eating Habits" and related learning content, should be facilitated through "experiential learning". Which is a teaching strategy, in order to enhance learners' interest in learning through "practice", and implement agriculture-related content in consumers' daily dietary life.

A lack of research on agricultural literacy limits educational programs. Significant changes in the type of agriculture experienced in the 21st century supports further investigation and evaluation of the concepts and understanding of agricultural literacy. Therefore, the purpose of this paper is to present an updated approach addressing different aspects of learning promoting agriculture literacy.

2. Literature

2.1 Why is Agriculture Literacy?

Literacy is generally defined as broad, relevant abilities in life (Government Printing Office, 1993) And there are further classifications based on specific functions, such as functional literacy, family literacy (Government Printing Office, 1993), workplace literacy (Sticht, 1988), scientific literacy (Bauer, 1994), technological literacy (Florida Department of Education, 2008), computer literacy, digital literacy (Ali, Raza & Qazi, 2023), information literacy (Hicks, 2021), artificial intelligence literacy (Laupichler, Aster & Raupach, 2023), financial literacy (Basha, Bennisr & Goaled, 2023) etc. From the above, it can be inferred that Literacy is a broad and comprehensive ability in life, with complex and diverse concepts and continuous growth with social changes and occupational needs, and depends on popular culture and social expectations. Literacy can also be viewed as the human capacity to engage in a range of life practices.

The National Research Council (1988) established the Agricultural Education in Secondary Schools Committee to examine the status and forecast the future of agricultural education. The Committee published its findings in a report, *Understanding Agriculture: New Directions for Education*, and defined agricultural literacy as: "An agriculturally literate person would understand the food and fiber system and this would include its history and its current economic, social and environmental significance to all Americans". Frick, Kahler, and Miller (1991) wrote "agricultural literacy can be defined as possessing knowledge and understanding of food and fiber systems. Meischen and Trexler (2003), defined agricultural literacy as entailing "... knowledge and understanding of agriculturally related scientific and technologically based concepts and processes required for personal decision making, participating in civic and

cultural affairs, and economic productivity”.

Frick et al., (1991) considered that agricultural literacy includes: Environment, processing, policy, natural resources, animal production, social significance, plant production, economic impact, marketing, distribution, and globalization. Therefore, this study considers agricultural literacy as an individual's ability to synthesize, analyze, and communicate basic information about agriculture.

2.2 What is P-game?

P-Game was inspired by two environmental negotiation games previously developed at the Massachusetts Institute of Technology (MIT). Najam (2001) developed the chlorine game for his dissertation: "Beyond the Lowest Common Denominator: Developing Countries in Global Environmental Negotiations". The international treaty negotiation game developed as part of the dissertation focuses on regulating the use of organochlorines on a global scale. The Chlorine Game is a hypothetical but realistic negotiation simulation involving senior diplomats, industry leaders, academics, government policy makers, NGOs and environmental activists from all continents of the world. The simulation provides an excellent opportunity for participants to think about the pros and cons of the various options on the table in a focused and systematic manner. In particular, the game gives players a deeper understanding of how the international treaty-making system works and how various countries and actors behave on the global stage. Based on the good experience of the chlorine game at MIT, Stokes and Selin (2016) at the same school developed the Mercury game simulating the negotiation of the United Nations (UN) global mercury treaty. Through this role-playing simulation, students have the opportunity to acquire substantive knowledge about an environmental issue - global mercury pollution. While the main question from participants was whether mercury is a global pollutant requiring global attention, participants were also asked to address specific questions about the possible form and scope of global cooperation.

Through the P-game teaching design method, students can discuss the topic or content of the course. Especially after the Covid-19 epidemic, students are very proficient in online classes and the operation of information software and hardware. There are many technologies that can support teaching and learning. Therefore, the teaching method of P-game is that students use information products to search online for discussions related to course content during class, and use high-quality dialogue simulations to allow participants to effectively learn on the basis of debate rules. This rule has been shown to engage students in co-participation (Eckstein & Bartanene, 2015)

3. Method

The P-Game, that will be developed on the success of MIT's Mercury Game and will take its rules from student debating. There are many different styles known to student debate, of which the British Parliamentary Style (BPS), which originated in Liverpool in the mid-1800s, is one of the most popular. In BPS debates, which provide the rules for international university debating competitions such as the World University Debating Championships, motions and oppositions in a parliamentary debate in the House of Commons or House of Lords in mock parliament are discussing a given bill. The topic discussed in this study using P-game is sustainable phosphorus production/management, and this topic can be used to improve students' agricultural literacy.

In each debate, four teams of eight speakers attempt to convince a panel of judges (usually experienced debaters) of their assigned point of view. In competitive debates, teams have 15 minutes to prepare for a motion before the debate. The team's position in the debate is determined by drawing lots. Each speaker then has the opportunity to present an argument during a 7-minute presentation, during which the opposing team can ask as many questions. The first and last minutes of each presentation should not be used for questions, giving speakers the opportunity to start and end their speech.

Based on the above, this study adopts the P-game teaching design in the course, and uses the British Parliamentary Style (BPS) discussion method to improve the agricultural literacy of the participants.

4. Analysis and discussion

This study uses open-ended questions to understand students' feelings about Phosphorus Science, Negotiation Science/Practice through P-game teaching methods. The open-ended questions are "How much and what do you think you learned about Phosphorus Science?", "How much and what do you think you learned about Negotiation Science/Practice?", "What would you like to learn about phosphorus Science and /or Negotiation Science/Practice?". Based on the content of students' answers, this study adopts a qualitative analysis method to understand the effect of students on teaching content and improving agricultural literacy.

In the question section of "How much and what do you think you learned about Phosphorus Science", the students answered the following results:

It's primary source of fuel and provide large scale low-carbon baseload electricity for more than 30 countries around the world. Uration recovery from phosphate is already a good idea with regard to resource conversation and SDGs of Un.

I learned I understands these and side effect.

I have understanding about its importance, now really than deed, just need more time for extra practice.

Students use the P-game teaching method in the course, and feedback after class tells that students can understand the current situation, possible side effects and importance of Phosphorus Science. Students mentioned that the various practices of Phosphorus Science mentioned in the course process can achieve the sustainable development goals proposed by the United Nations, and have a significant effect on protecting the earth's environment and improving students' agricultural literacy.

In the question section of " How much and what do you think you learned about Negotiation Science/Practice? ", the students answered the following results:

We should talk with our teammates and try to find weak points of opposition. I am the last person so I need to summarize what my teammates said.

It's important to know what other people think about what we're discussing. We learn moral skills and techniques.

I have learned and gained knowledge and how debates work, based on science and environment.

In this study, the teaching process of P-game is based on the British Parliamentary Style (BPS) debate. It is the first time for students to encounter this teaching method and feel very novel. From the student feedback content, we know that students can acquire knowledge about agricultural literacy and the operation process of the debate through BPS. In addition, students believe that during the debate process, they need to fully understand the narrative content of the team members and the other party, such as summarizing the opinions of the team members, trying to find arguments against the theme, and learning professional knowledge about agriculture through continuous dialogue and discussion. Therefore, this study proves that the P-game teaching method can stimulate students' learning motivation, which is obviously different from the traditional narration method.

In the question section of " What would you like to learn about phosphorus Science and /or Negotiation Science/Practice? ", the students answered the following results:

Phosphorus B a topic that I would only associate with agriculture. I think that there is more for me to learn from this element.

*When I hear the term negotiation I always think about the business management, I very important for me to learn more in how science can be negotiated.
Since I am not a Science person, I think practice is essential in all field.
I just know phosphorus is an element in periodic table and one of essential elements. But I haven't study especially about this so I am hoping I'm get some knowledge from this class*

Due to the nature of major courses, most students have little contact with agricultural courses, but through this course, students think that they can understand Phosphorus Science better. In addition, the P-game teaching method is adopted this time. For the first time, students use the debate method to learn more about how to negotiate scientifically. Students can learn agricultural education content and agricultural literacy in the course, and students have the opportunity to learn across fields.

5. Conclusion

An integral part of a complete agricultural education system is agricultural literacy. Agricultural literacy is the synthesis, instruction, and communication of basic information about agriculture to the public. In order to improve students' agricultural literacy, this study adopts the P-game teaching method to let students break away from the traditional teacher centered teaching method, and into learner-centered teaching, in which students become the protagonists of learning. The results of this study show that college students in non-agricultural fields can effectively improve students' agricultural literacy by learning agricultural-related course topics through the P-game teaching method. From qualitative analysis of students' feedback, we can know students' interest in agricultural courses, and gain specialized knowledge on subjects in the agricultural curriculum. Therefore, the P-game teaching design in this study can be continuously adapted and used in agricultural courses in the future to deepen students' understanding of agriculture.

Since the P-game teaching method proposed in this study has not been popularized yet, the results of this study prove that P-game has practical efforts toward teacher instruction and student learning. It is suggested that future research can try to apply P-game teaching method to other courses to verify this teaching the feasibility of the law.

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