ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue V, May 2026

Knowledge, Attitude, and Digital Literacy of Agriculture Students

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DOI: https://doi.org/10.51583/IJLTEMAS.2026.150500197

Received: 10 May 2026; Accepted: 15 May 2026; Published: 13 June 2026

ABSTRACT

This study was conducted at Pangantucan Bukidnon Community College (PBCC) in the Philippines. The objective of the study is to determine the students' knowledge, attitudes, and digital literacy on digital mass media. The data were collected personally by the researcher from the 2nd-year and 3rd year students of Pangantucan, Bukidnon Community College. A total of 108 students served as respondents in the study. Frequency counts, Likert scales, and ranks were employed. Findings show that the primary devices used by the participants were phones(97.22%) with secondary devices being laptops. The average screen time spent by students in using mass media is four hours. The most accessed digital platforms are Facebook, YouTube, and TikTok, while the webpage from the state and universities is moderately utilized. Digital mass media were perceived by Students positively with a positive attitude on digital tools with high level of knowledge. The level of usage was moderate (overall mean = 2.97), with Facebook groups, YouTube tutorials and TikTok content being used the most for agricultural information. The sample was overwhelmingly male (53.21%) as are the demographics of the agricultural workforce nationally.Digital mass media was considered very useful in learning about agriculture by the students (with overall mean score 4.18) because it is relevant, convenient and can make learning more easy for complex topics. The attitudes expressed were overwhelmingly positive, with a strongly agree rating with an overall mean of 4.68, which means that digital media helps to increase involvement, motivation and independent learning. The overall mean of the knowledge level was also rated as high (3.88), which indicates students' ability to use digital tools for academic and agricultural activities, as well as evaluate information retrieved from the internet. The frequency of digital mass media exposure was also high (overall mean 3.48), with numerous uses across multiple platforms and seeking out agricultural information. Challenges faced by the students include rampant fake news, intermittent internet connection, and limited research on agriculture students' digital self-efficacy.

Keywords: Digital Mass Media, Agricultural Education, Digital Literacy, Student Perception

INTRODUCTION

Background of the Study

The growing digital mass media has transformed the agricultural communication environment and redefined the processes of information creation, reception, and sharing amongst a continuum of stakeholders. Facebook, YouTube, Tik Tok, and online news sources are the new media channels, which have become leading channels through which the agricultural knowledge, market insights, climate alerts, and technology innovations can spread in the recent years (Aker et al., 2021). These media have democratized the provision of information, and the interactive mode of communication has been very quick and has eliminated the limitations associated with the traditional modes of extension. With the further integration of digital tools in the world of agriculture, the role of digital mass media in strengthening the process of learning, decision-making, and extension becomes even more relevant especially to the younger generations who are digital natives.

The use of digital media in the agricultural sector in the Philippines is gaining momentum, but there are still unequal distributions, connectivity, and digital literacy, particularly in rural areas where many State Universities and Colleges (SUCs) are located (Talandron et al., 2023). Although national programs encourage the use of

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digital agriculture and ICT-based extension, the degree to which the learners of agriculture are involved in and take advantage of digital mass media has not yet been decided. There is thus a need to understand how they perceive and therefore, to be able to design responsive curricula, enhance the digital literacy programs and prepare them to work in agricultural careers that are technology driven.

Although the current importance of digital mass media in the area of agricultural education is increasing, there is limited research on the specific perception of agricultural students concerning the use of the digital mass media. The current literature mainly focuses on the farmers, young people in general, or even students who do not pursue agricultural studies (Ernest and Kuta, 2021; Mercado and Osbahr, 2020). This gap indicates the need to conduct empirical studies which explore how students of agriculture assess, use and implement digital mass media in scholarly and pre-professional environments. They are invaluable in improving agricultural education, optimizing digital extension plans, and national plans to modernize agriculture.

Most studies that have been conducted focus on farmers or general students population, thus failing to represent the needs and context of agriculture students that are very different. The literature that has been found provides very little information regarding the perception of credibility of digital media by students. The spread of agricultural influencers, vloggers, and user-generated content has intensified the concerns upon misinformation (Aranguri et al., 2022). However, the majority of studies analyze the perception of accuracy, credibility, and applicability of online agricultural information by agriculture students. There is a lack of studies dealing with digital mass media as an extension tool among students. Students as future extension professionals should be ready to use digital platforms as means of communication and transferring knowledge. However, their apparent preparedness, self-confidence and proficiency in utilization of digital media to create extensions are not clear. Socio-psychological variables, including digital self-efficacy, technology motivation, attitudes toward technology, and perceived usefulness are scarcely studied in the area of agricultural education. These variables that have been known to affect the adoption of technology (Davis, 1989) are poorly researched in determining the perception of digital mass media by agriculture students. Taken together, these gaps highlight the need to conduct an all-encompassing research that examines

Research Objectives

This study aimed to: (1) determine the primary and secondary devices used by agriculture students to access digital mass media; (2) assess the average daily screen time spent on digital media; (3) describe the usage patterns of specific digital platforms for agriculture-related information; (4) measure students' perception, attitude, knowledge, and exposure to digital mass media; (5) identify the demographic profile (sex) of agriculture students; and (6) identify challenges faced in using digital mass media.By filling these gaps, it will aid in improving the state of agricultural education. The rapid expansion of digital mass media has fundamentally transformed agricultural communication, redefining how information is synthesized and shared across the value chain.

METHODOLOGY

Bukidnon is a landlocked province in Northern Mindanao, positioned in the Mindanao heartland. It's far linked to Davao in the south and north of the island. The topography is mostly grassland with a median elevation of 915 meters. Low plains and hills, valleys, and deep canyons represent the terrain. It lies among the parallels 7 '25' and 8 '38' north range and meridians 124'16' east longitude. The vicinity is characterized by mountainous terrain that are often taken into consideration as marginal farmlands. The sloping farmlands of Bukidnon are home to Indigenous and smallholder farmers and data some of the best poverty incidents within the region. Bukidnon is a province that provides a selection of sources and viable engagement for diverse resources and profits. It is the home of the sector's widest pineapple plantation, boasting a conventional golfing route dating back to 1928. it's also the most essential livestock-producing province in the vicinity. It's miles adequately endowed with herbal points of interest, particularly Kitanglad stages that include Mt. Dulang-Dulang, the second maximum top in the country. it's been diagnosed as one of the country's healthiest biodiversity and richest endemic species of fauna and plants. The study area was conducted in Pangantucan Bukidnon Community College. Pangantucan Bukidnon Community College (PBCC) -Pangantucan, Bukidnon (LUCs). It was chosen as it offers agriculture degree program in rural area with a service to rural and agricultural communities and

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represent the digital divide and ICT access issues recorded in the region. It is under the Municipality of Pangantucan, Bukidnon. The study employed a combination of methods in order to measure the knowledge and attitude of students. A purposive sampling technique was utilized to select 108 respondents from the 2nd and 3rd-year levels, specifically targeting those training to become future extension specialists and agripreneurs in rural Bukidnon. The data collection tool was an expanded structured questionnaire validated to measure not only general digital usage but also specific indicators of SDG 4 (Quality Education) and SDG 2 (Zero Hunger). Figure 1 presents the map showing the locale of the study.

Questionnaires were developed based on existing validated scales and the number of items per construct. Reliability report Cronbach's alpha for each construct: perception, attitude, knowledge, exposure, usage patterns; the benchmark is $\alpha \geq 0.70$. Pilot Testing were done to the none participants of the study and based on the results from the pilot testing modifications were done. A simple random sampling were done to the total population of 2nd and 3rd year agriculture students. Also, clarify the Likert scale anchors consistently: Tables 1, 7, 8, 9, 10 use different anchors (Moderately Agree, High, Strongly Agree, etc.). The authors should use a consistent 5-point Likert scale with anchors: 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree. Then recalculate means and reinterpret accordingly. If different scales were used for different constructs, explain why.

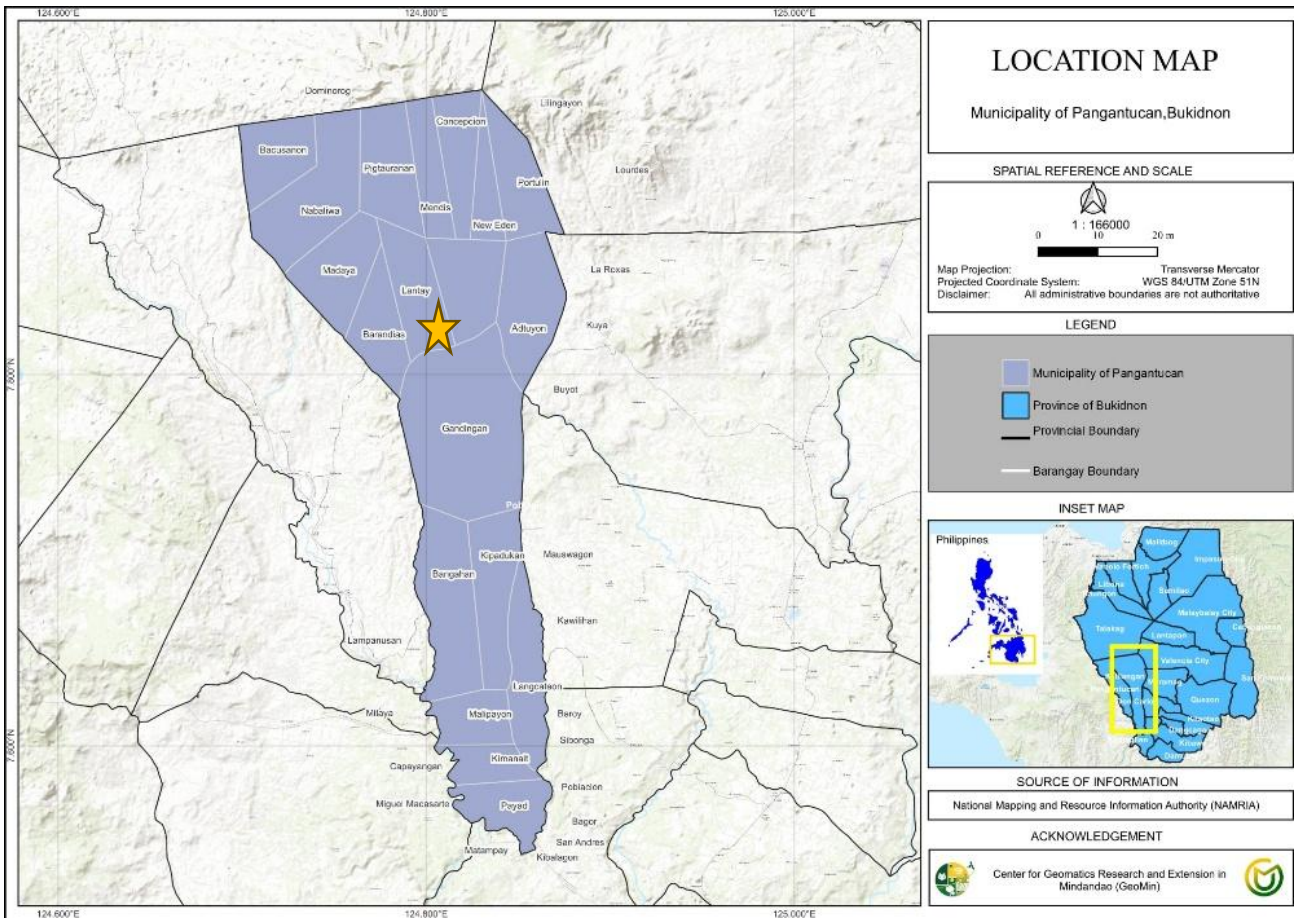


Figure 1. Map of the Philippines and Bukidnon showing the locale of the study

RESULTS AND DISCUSSION

Primary Devices used in digital Mass Media. Figure 2 presents the primary devices used by the participants in accessing agriculture related information. It can be gleaned that the majority(97.22%) of the participants uses cellphone. While the remaining participants use laptops. It means that most of the participants' available devices were cellphones, as it is most accessible and affordable devices to use. This result is similar to the study of Al-Maroof and Al-Emran (2018), students prefer cellphones to support quick online access to resources and learning applications. While Lau et al. (2020), phones were reported that phones were used as primary ICT tools in accessing online applications, which surpasses laptops and desktop computers.

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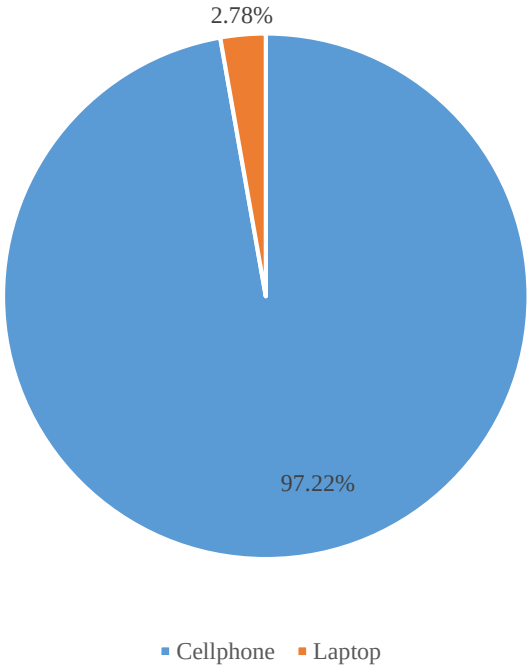


Figure 2. Primary Devices used in digital Mass Media

Other devices used in accessing Digital Mass Media. Figure 3 presents the other devices used to access digital mass media for agricultural-related information. More than one half of the participants uses laptops as their secondary device. This means that the second available device for the students was laptops. This result is consistent with the study of Panganiban et al. (2022), who mentioned that laptops were preferred secondary and supplementary devices of college students to access digital learning resources. Dela Peña and Escoto (2021), laptops have a larger screen, document processing, and online accessibility. Carbado (2021) access to digital modules, research articles, and online extension materials that are difficult to navigate on mobile phones.

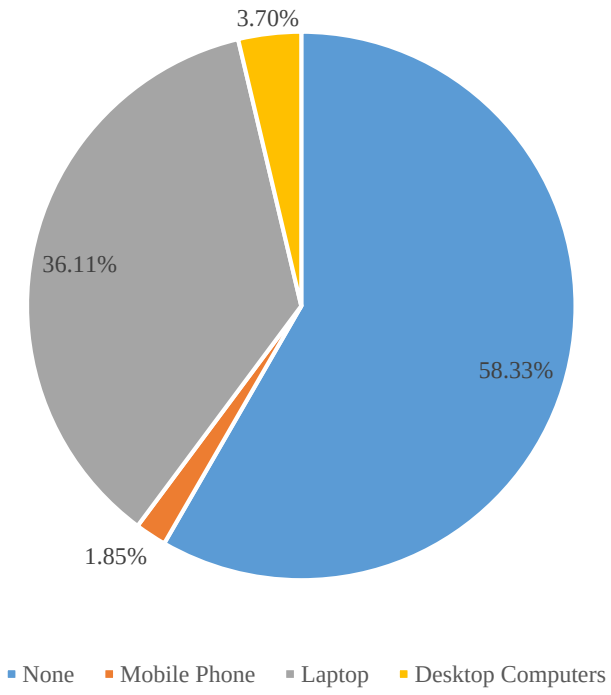


Figure 3. Other devices used in accessing Digital Mass Media

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Average Daily Hours spent on digital Mass Media. Figure 4 presents the average daily hours spent by the students in accessing digital mass media. It can be gleaned that 37% of the participants are using their devices for four hours in order to access digital mass media. (Pacis & Alidayo (2025) reports that Filipino students average three to five hours a day on the internet on academic work, communicating, and seeking information. On the same note, Dizon and Santos (2022) found that online learning and the use of digital resources make college students spend between four and six hours a day on the screen. All the studies positively support the fact that a four-hour per day use pattern is common among Filipino students who use digital academic environments.

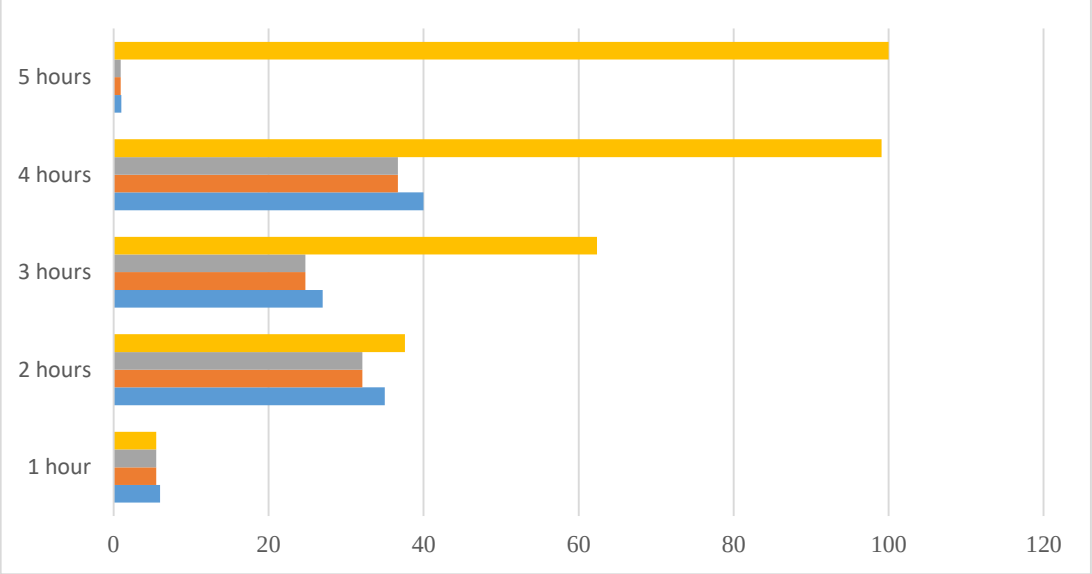


Figure 4. Distribution of the participants' average daily hours spent on digital mass media

Usage Patterns of Digital Mass Media for agriculture related information. Table one presents the usage patterns of agriculture students of mass media for agriculture related information. Based on the result, participants showed an overall mean of 2.97, which means moderately agree. The participants rated all the indicators as very high or moderately agree. This implies that these platforms were used moderately by the participants.

Table 1. Distribution of the participants' usage patterns of Digital Mass Media for agriculture related information

INDICATORS	WEIGHTED MEAN	DESCRIPTIVE RATING
1. Facebook agriculture pages/groups	3.32	Moderate
2. YouTube agriculture tutorials	3.31	Moderate
3. TikTok agriculture content	3.18	Moderate
4. Government/DA/ATI online platforms	2.87	Moderate
5. SUC-based digital extension materials	2.64	Moderate
6. Online news outlets on agriculture	2.89	Moderate
7. Podcasts/webinars on agriculture	2.59	Moderate
OVERALL MEAN	2.97	Moderate

Legend: 4.51-5.00 Strongly Agree 3.51-4.50 Agree 2.51-3.50 Moderately Agree 1.51-2.50 Disagree 1.00- 1.50 Strongly Disagree

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Sex. Figure 4 shows the distribution of the participants according to sex. More than one half (53.21%) of the students were males. This implies that the students were male-dominated. Montecillo (2016) stated that in the field of agriculture, males were traditionally more dominant than women. Additionally, the Philippine Statistics Authority (2005) states that males made up the majority of agricultural operators compared to females.

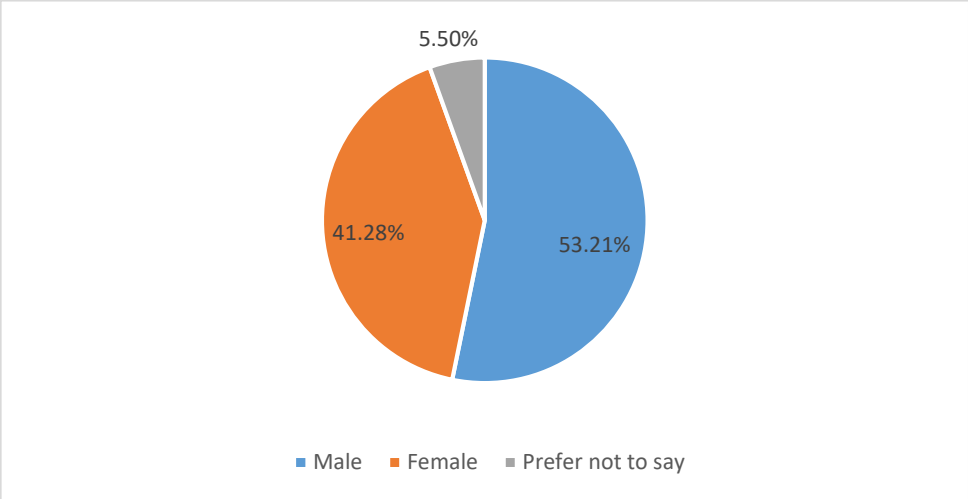


Figure 5. Distribution of the students according to sex

Usefulness of Digital mass media for agriculture students. Figure 5 shows the distribution of the participants according to the usefulness of digital mass media as source of information. More than one half (53%) of the participants agreed that they were using digital mass media as source of information in agriculture related information for class purposes.

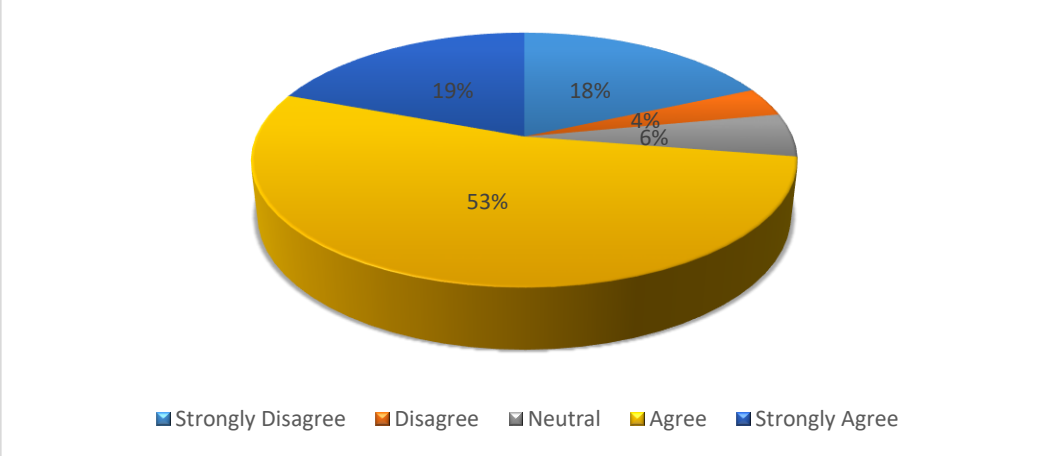


Figure 5. Distribution of the usefulness of Digital mass media for agriculture students

Perception towards Digital Mass Media

Table 7 shows the participants perception towards Digital Mass Media. Based on the result, students showed very high attitude towards Digital Mass Media with an overall mean of high (4. 18) . The students rated high on all the indicators. This implies that the students has a positive attitude toward Digital mass media.

Table 7. Perception of students towards Digital Mass Media

INDICATORS	WEIGHTED MEAN	DESCRIPTIVE RATING
I believe that digital mass media is useful for learning agricultural concepts.	4.39	High

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I believe that digital mass media keeps me updated on agricultural information.	4.17	High
I believe that digital mass media enhances my communication skills with others.	4.17	High
I believe that digital mass media is relevant to my academic needs.	4.43	High
I believe that digital mass media helps simplify complex agricultural topics.	4.04	High
I believe that digital mass media is an effective tool for agricultural education.	3.56	High
I believe that digital mass media exposes me to diverse information about agriculture.	4.29	High
I believe that digital mass media helps me access information on agricultural innovations quickly and conveniently.	4.37	High
OVERALL MEAN	4.18	High

Legend: 4.51-5.00 Very High 3.51-4.50 High 2.51-3.50 Moderate 1.51-2.50 Low 1.00- 1.50 Very Low

Attitudes Towards Digital Mass Media. Table 8 presents the students attitudes towards digital mass media in agriculture learning. The participants strongly agree with all the statements regarding the Attitude towards Digital Mass Media with an overall mean of 4.68. The participants express a strong agreement that they enjoy using Mass media in Agriculture (4.77), digital Mass Media makes agriculture learning more engaging (4.75). This implies that the students has positive attitude towards digital mass media.

Table 8. Attitude towards Digital Mass Media

INDICATORS	WEIGHTED MEAN	DESCRIPTIVE RATING
I enjoy using digital media to learn about agriculture.	4.77	Strongly Agree
Digital media makes agricultural learning more engaging.	4.75	Strongly Agree
I feel positive about integrating digital media into education.	4.72	Strongly Agree
Digital media is a valuable tool for agricultural students.	4.70	Strongly Agree
I prefer digital media over traditional sources.	4.66	Strongly Agree
Digital media motivates me to explore agricultural content.	4.66	Strongly Agree
Digital media encourages independent learning.	4.66	Strongly Agree
OVERALL MEAN	4.68	Strongly Agree

Legend: 4.51-5.00 Strongly Agree 3.51-4.50 Agree 2.51-3.50 Moderately Agree 1.51-2.50 Disagree 1.00- 1.50 Strongly Disagree

Self-Perceived Digital Competence

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Table 9 shows the Knowledge of students on Digital Mass media. The participants rated 3.88 their knowledge on digital mass media which means high. This implies that the participants has knowledge on Digital mass Media. Students are generally knowledgeable on the content. This implies that students has knowledge on digital mass media.

Table 9. Knowledge of Digital Mass Media

INDICATORS	WEIGHTED MEAN	DESCRIPTIVE RATING
I have knowledge in using digital mass media for agricultural learning purposes.	3.83	High
I have practical skills in acquiring farming information from online content.	3.93	High
I have a broad knowledge of digital media, which enhances my problem-solving in agriculture.	3.94	High
I apply what I learn from digital media in academic tasks.	3.83	High
Digital media provided me with knowledge in exploring new agricultural technologies.	3.61	High
I have digital skills in evaluate fake and legit online agriculture content.	3.81	High
I can use digital tools to collect and analyze field data (e.g., surveys, mobile apps, Google Forms,).	3.99	High
I can confidently conduct online or virtual activities (e.g., webinars, online consultations).	4.00	High
I have sufficient exposure and skills to digital platforms used in agricultural extension.	3.94	High
OVERALL MEAN	3.875	High

Legend: 4.51-5.00 Very High 3.51-4.50 High 2.51-3.50 Moderate 1.51-2.50 Low 1.00- 1.50 Very Low

Digital Mass Media Exposure. Table 9 shows the Distribution of students according to Digital Mass Media Exposure. The Students rated the digital mass media exposure with an overall mean of 3.48 which means high. In particular, the students rated as high on all the indicators.

Table 10. Distribution of students according to Digital Mass Media Exposure

INDICATORS	WEIGHTED MEAN	DESCRIPTIVE RATING
I frequently use digital media such as Facebook to access agricultural information.	3.39	High
I am following legit agricultural pages, channels, or influencers online for learning purposes.	3.86	High

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I am using multiple platforms such as YouTube, TikTok, Facebook, Instagram, web, and etc for agricultural learning.	3.64	High
I encounter agricultural content on social media.	3.61	High
I mostly use digital mass media rather than the traditional sources for agricultural information.	3.45	High
I actively search for agricultural tutorials or demonstrations online.	3.68	High
I participate in online groups or communities related to agriculture.	3.24	High
I receive agricultural information through messaging apps.	2.94	Moderate
OVERALL MEAN	3.48	High

Legend: 4.51-5.00 Very High 3.51-4.50 High 2.51-3.50 Moderate 1.51-2.50 Low 1.00- 1.50 Very Low

DISCUSSION

THE Findings of This Study Indicated That the Agricultural Students of Pangantucan Community College, Bukidnon Are Highly Involved With the Use of Digital Mass Media and Their Most Used Device in Accessing Agricultural Information is Their Mobile Phones. This is a Mobile First Behavior That is Consistent With the National and Regional Trend of the Use of the Mobile Phone as the Most Accessible and Used ICT Device by Students in Low Resource Settings (Al Maroof & Al Emran, 2018; König et al., 2020). The Level of Mobile Phone Usage is an Indicator of the Need to Create Mobile Friendly Digital Content for Extension and Agriculture Learning Resources.

The Moderate Level of Digital Platform Use for Agriculture Related Information (Overall Mean = 2.97) Indicates That Students Often Use Digital Media, But Not in an Intensive Way When it Comes to Agriculture Related Information. Frequently Used Social Media Platforms, by the Students Were the Facebook Groups, YouTube Tutorials, and TikTok Content, Which Shows How Important is the Platforms as a Learning Tools for Agriculture Content. This Result Conforms With the Study of Mercado and Osbahr (2023), Which Revealed That Social Media Has Become a Key Source for Rural Youth to Access Agricultural Information, Acquire Skills, and Learn About Innovations.

The Participants Rated the Overall Perception on the Digital Mass Media (M = 4.18) Which is Generally High and With a Very Positive Attitude (M = 4.68) Toward Digital Mass Media. The Result Implies That the Participants Has a Strong Acceptance of Digital Tools in Students' Learning Environment. Participants Perceived That Digital Media is Helpful, Relevant and Useful in Learning Agriculture as a Degree Program, to Make Complex Ideas Easier to Understand, and to Be Up to Date With Agricultural Innovations. This Confirms Previous Studies Which Showed That Digital Media Can Improve Engagement, Motivation and Self-Learning in Agricultural and Technical Subjects (König et al., 2020).

in Terms of Digital Competence the Participants Rated the Digital Literacy (M = 3.88) This Shows That the Students Has the Confidence and the Knowledge in Using and Browsing Digital Platforms as Source of Agricultural Information for Classroom Used. Students Has the Capacity to Check and Evaluate From Legit and Fake News. This is Especially Crucial in the Face of Misinformation in Digital Environments. According to the Study of Vraga and Bode (2021) Eportefake News and Misinformation Are Rampant on Social Media and Can Spread Quickly; Therefore, the Level of Students' Digital Literacy and Critical Evaluation Skills is Crucial.

Digital Exposure (M = 3.48) Was High, This Implies That Students Were Likely to to Watch and See Agricultural Content on Various Platforms. The Moderate Level of Institutional Digital Extension Efforts Through Government and SUC Based Platforms, However, Underscores a Gap in Institutional Digital Extension

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Efforts. Rola et al. (2020) Observed That Despite the Growing Number of Digital Agriculture Initiatives in the Philippines, Government Platforms Are Still Not That Easy to Use, Accessible, and Are Not Designed for the Young. Improvement of These Platforms Can Improve the Linkage of Formal Agricultural Education and Digital Extension Services.

The Gender Profile of the Respondents is Still Male-Dominated (53.21%) as Pointed Out in the Long-Standing Gender Profile in Philippine Agriculture. The Food and Agriculture Organization (2018) Showed That Males Still Dominate the Number of Agricultural Operators in the Country. This Highlights the Importance of Gender-Responsive Digital Literacy Initiatives to Make Digital Tools and Agricultural Information Accessible to Everyone.

The Results Have Shown That the Use of Digital Mass Media Has a Significant Influence on How Agriculture Students Learn, Communicate and Interact With Agricultural Knowledge System. Digital Platforms Can Be Used for Information as Well as for Motivation, Engagement and Independent Learning. Thus, the Use of Digital Tools in Agricultural Education is Crucial to Equip Students With the Skills Needed for an Agricultural Industry Moving Towards Digitalization.

CONCLUSION

Based on the findings of the study, the following conclusions were drawn:

The study supports that digital mass media is a critical part of agricultural learning and agriculture students are highly dependent on mobile technologies to gain information from the media. The most preferred device was cellphones (97.22%) because it is affordable, readily available and is the most suitable to get quick access to the internet. Laptops were the secondary device used by the students used by the students in accessing digital mass media. In addition, the average daily “digital mass media” use reported by students was 4 hours per day, similar to the pattern of use found in the nation when students are online for academic purposes. The students' perception, attitude, knowledge and exposure were high to very high with overall mean of 4.58, 4.57, 4.56 and 4.32 respectively, while use of specific digital platforms for agriculture-related information of students was moderately low with overall mean = 2.97. Students perceived the digital media useful, relevant and effective for learning and they were enjoying and motivated by the use of digital tools and had good digital skills in assessing online information and using the digital tools for learning and farming. Students were also very active on social media platforms such as Facebook, YouTube and TikTok, which further cement the role of digital environments in their learning. The male participants in the demographic profile reflects the overall trend of agriculture where men are the dominant gender and the importance of the role played by the digital platforms in relation to traditionally male-dominated agricultural sectors. The overall results indicated that digital mass media not only in improving the access of agricultural information, but also to improve the digital literacy of students in agricultural studies, engagement and independent learning. Positive attitudes, high perceived digital competence, moderate use of the government/SUC platforms; Supports Technology Acceptance Model; digital natives are okay in using social media to learn, but may have to learn how to determine a credible source of information; PBCC can incorporate digital literacy into the curriculum, can train students to assess online information, and can develop a mobile extension repository. Commission on Higher Education (CHED) provides assistance to the digital infrastructure in rural LUCs, creates extension materials that are mobile-friendly, and collaborates with social media personalities to spread information on agriculture. The outcome of the study may necessitate additional studies.

ACKNOWLEDGEMENTS

The author extends heartfelt gratitude to various individuals who have played pivotal roles in her academic journey. The author would like to thank her family, John Rae, Zeanne Rae, and Rae Emil for their boundless love, unwavering support.

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