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EFFECTIVENESS OF AI GENERATED MULTI-MEDIA TEACHING AID ON IDM IN CONTROLLING RICE BLAST: A CASE AT THADNONGIAW VILLAGE, RI-BHOI, MEGHALAYA

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ABSTRACT

Rapid advancements in Artificial Intelligence (AI) technology have brought about revolutionary shifts in a variety of industries. Constant changes in technology have led to new cultures and mode of learning. AI enhanced multi-media for learning had more positive results towards learners (Mayer, 2018). To be able to create clear-cut & purposeful teaching objectives; be enthusiastic & interested by the learner on the subject matter; be able to communicate & skillful in using teaching aids; and be able to encourage participation of the learner, creation of AI-generated Multi-Media teaching aids for farmers has been felt. The 'Rice Blast' is reported to be one of the commonest diseases of paddy in the 'Rice Bowl' region of Meghalaya at paddy fields in villages of Bhoirymbong C&RD Block of Ri-Bhoi. Keeping into consideration the preceding paraphernalia, the following three research objectives have been formulated, viz., (1) To understand the level of awareness of farmer on IDM of Rice Blast; (2) To create an Artificial Intelligent multi-media teaching aid for IDM of Rice Blast; and (3) To examine the effectiveness of multi-media teaching aid for IDM of Rice Blast. The study followed Exploratory Research Design. Purposive sampling method was administered in order to select 20 respondents. The scientific inquiry could unveil that majority (65%) of the respondents were in middle age groups and 55% of the respondents were female. Higher percentage (40%) of the respondents had primary level of education. Inquisitively, it was observed that more than half of the total respondents (55%) had low level of awareness on IDM of 'Rice Blast'. The study could create an Artificial Intelligent multi-media teaching aid for Control of Rice Blast *(a.k.a* AI4CORB) using ChatGPT +4 and DALL E.3. A statistically significant effectiveness @ 0.01 level of significance on awareness and understanding on IDM of Rice Blast by respondents of the study was observed owing to the intervention of AI4CORB. The scientific inquiry recommends to establish training programs for farmers using AI based multi-media tools to enhance immersive learning and understanding of complex-abstract-cognitive domains of farming.
Keywords **:** Artificial Intelligence, Rice Blast, DALL E.3, ChatGPT +4, AI4CORB.

Introduction

Rapid advancements in Artificial Intelligent technology have brought about revolutionary shifts in a variety of industries, in which agriculture is not an exception. Constant changes in technology have led to new cultures and places of learning (Thomas and Brown, 2011). With the rapid development of AI technology, educators need to adapt to emerging technology that can potentially change how we work and produce. Artificial Intelligence (AI) represents new digital technology that have great power to change society (Ringvold, 2023). AI refers to the simulation of human intelligence in machines that are programmed to think and act like humans. This field involves the creation of intelligent algorithms that can learn through data and execute tasks typically done by

people. AI has become pervasive in the lives of twenty-first century citizens and is being proclaimed as a tool that can be used to enhance and advance all sectors of our lives (Górriz *et al.,* 2020). With the widespread use and rapid technological development, there is a need for research to look at the possible use and application of AI text-to image generation. The researcher felt the importance of AI-generated images in education that has the potential to transform the way that farmers learn and could lead to more effective and efficient outcomes. To be able to create clear-cut & purposeful teaching objectives; be enthusiastic & interested by the learner on the subject matter; be able to communicate & skillful in using teaching aids; and be able to encourage participation of the learner, creation of AI-generated Multi-Media teaching aids are sine-qua-non. Rice (*Oryza sativa*) is the major food crop for the world's population and Asia accounts for about 90% of the world's rice production and consumption and similar is the case for the population of Meghalaya. The 'Rice Blast' is reported to be one of the commonest diseases of paddy in the 'Rice Bowl' region of Meghalaya at Bhoirymbong C&RD Block of Ri-Bhoi, a teaching tool focused on this issue has been the felt need of extensionists. The disease appears in the form of leaf blast, panicle blast or neck rot, collar rot and node blast (Iwata, 2001). Hence, educating farmers about IDM (Integrated Disease Management) strategies through an engaging multimedia tool can promote more sustainable & environment friendly farming practices. The villages within the Bhoirymbong C&RD Block of Ri-Bhoi, a key agricultural area, have been particularly hard-hit, highlighting the urgent need for innovative solutions to educate and empower the local farming communities. With these backdrops the following research objectives have been formulated which are

Objectives of Study:

1. To understand the level of awareness of farmers on IDM of Rice Blast.
2. To create an Artificial Intelligent Multi-Media teaching aid for IDM of Rice Blast.
3. To examine the effectiveness of Multi-Media teaching aid for IDM of Rice Blast.

Understanding the level of awareness of farmers on IDM of Rice Blast

In their research study conducted in Morogoro and Tanga regions in Tanzania by Hashim *et al.* (2018), it was found that about 46.3% of the respondents were not aware of the cause and spread of rice blast disease. Lack of knowledge, ability to afford and unavailability of effective blast disease control methods were reported to affect the management of the disease. Kega *et al.* (2015) revealed that farmers' awareness of Integrated Disease Management (IDM) for Rice Blast was assessed using a logit analysis, revealing significant influences of age, occupation, training, and gender on disease knowledge.

In a study conducted by Nath *et al.* (2020), it was found that farmers in Indian Sundarbans have medium knowledge levels on plant protection measures against rice blast disease, with 75% aware of the disease and its symptoms, but only 22.5% know the recommended fungicide dose. Akter (2019) in his study observed that farmers' awareness on Rice Blast disease management in Bangladesh was low, with only 30% knowing about it. Most farmers (89%) used chemicals, but effectiveness was perceived low.

Usages of AI text to image generation

Parr *et al.* (2021) in their study revealed that AI-generated text to images in agriculture aids in automated indexing, clustering, and classification for research project management, personalized nutrition, and invasive pest detection, enhancing agricultural practices. Ringvold *et al.* (2023) in their research states that AI text-to-image generators are highly useful in creating visual representations based on text prompts, expanding the possibilities of visual art creation, such as in the construction of illustrations for a comic books. AI text-to-image generators are utilized in art and design education to enhance learning by providing students with a tool to visualize their ideas and explore different prompts and settings.

Ramyashree and AS (2022) in their study revealed that AI-generated text to images in agriculture aids in detecting and classifying plant diseases through image processing. The KNN classification method achieved 98.23% accuracy in disease prediction.

Chakraborty *et al.* (2022) in their study revealed that AI-generated text to images can enhance smart agriculture by analyzing multi-sensor data for monitoring crops, soil, pests, and more, aiding in efficient farming practices and decision-making processes. AI-generated text to images in agriculture can be utilized to detect plant gaps in fields, enabling visual representation of stressed areas for prompt action based on the analysis. Madokoro *et al.* (2022) in their study revealed that AI-generated text-to-image can aid in agricultural tasks like crop monitoring and disease detection. Lu *et al.* (2022) reflected that the AI-generated text-to-image through GANs in agriculture aids in tasks like plant health assessment, weed detection, fruit quality evaluation, and more, enhancing

model performance and reducing manual data preparation efforts.

Sapkota (2023) revealed from his studies that the advanced AI image generators *viz.,* Stable Diffusion, DALL·E 2, & Midjourney were tested in generating AI based communication materials. The DALL·E 2 model had a significant role in enhancing visualization processes in agriculture, with potential applications in precision agriculture. In a study conducted by researchers from Germany and the USA, the capabilities of DALL-E 2 were explored in the medical field, specifically for generating and manipulating radiological images such as X-rays, CT scans, MRIs, and ultrasounds. The study revealed that DALL-E 2 was particularly proficient in creating realistic X-ray images from short text prompts (Adams *et al.,* 2023).

Sornapudi (2023) states that AI-generated text-to-images in agriculture can aid in tasks like automated labeling, phenotyping, and image retrieval, enhancing efficiency and analysis accuracy in digital agriculture. Balasubramanian (2024) revealed that AI-generated text to images in agriculture aids in crop monitoring, identifying crop health, readiness for harvest, and optimizing resource management through drone imaging technology and precision farming techniques.

Effectiveness of using multi-media teaching aid

Using multimedia teaching aids in agricultural programs enhances learning outcomes by providing real-life context, improving teaching quality, and enabling learners to acquire practical knowledge and skills effectively (Hassen, 2013). Olori and Igbosanu (2016) in their study revealed that the use of computer-based multimedia presentations significantly enhances Senior Secondary Students' achievement in Agricultural Science, indicating effectiveness in improving learning outcomes in farming education. According to Sharma (2016), multimedia modules significantly enhance knowledge gain and retention among dairy farmers, particularly in scientific dairy farming practices like calf rearing, clean milk production, and reproductive management.

It has been demonstrated by research on using multi-media for learning, that there are more positive results observed in learners who combine picture and words than those who use words only (Mayer, 2018). Hassan (2018) in his study revealed that there is significant increase in the awareness and knowledge of the banana growers on technologies like pseudostem injection, fertigation and drip irrigation practices due to administration of multi-media teaching tools. Using multimedia campaigns improved farmer knowledge on soybean production by increasing exposure to messages, enhancing understanding, and positively impacting productivity and practices, particularly regarding the use of inoculants (Musebe *et al*. 2019).

Kaahwa *et al.* (2019) states that the effectiveness of audio media, specifically radio broadcasts and audio CDs, significantly enhances smallholder banana farmers' knowledge on proper farming practices, irrespective of farmers' characteristics. Using agricultural videos on YouTube enhances young farmers' skills and knowledge, reducing cognitive load, saving time, energy, and costs, ultimately improving learning outcomes in agriculture (Paudi *et al.,* 2022). According to Sahu *et al*. (2022), it was found that the multimedia training module had significant effect on the knowledge gain on bio-control agents farming practices. Using video aids in training low-caste female farmers in rural India improved adoption of System of Rice Intensification, increasing yields by 20-30% and leading to higher profits and reduced off-farm labor (Baul *et al.,* 2024).

Materials and Methods

The study was conducted in Bhoirymbong C&RD Block of Ri-Bhoi district of Meghalaya as it is the Rice bowl region. ‘Rice Blast’ is the most common disease of Rice in that region. The Primary data was collected through Personal interview using Interview Schedule. Twenty (20) rice growers from Thadnongiaw village were selected as respondents of the study with the criteria that the respondents should have an experience of more than six (6) years. Exploratory research design was administered in the scientific inquiry and purposive sampling design has been implied upon. Wilcoxon-Signed Ranks Test was administered to test the Hypothesis. The Wilcoxon-Signed Ranks Test is nonparametric statistical test used to compare two related samples.

Therefore, Wilcoxon signed-rank test was used to compare post intervention of AI4CORB score and pre intervention of AI4CORB score in rice farmers of Thadnongiaw village. Differences between paired scores were ranked according to their absolute values. The test was conducted at a significance level of 0.01.

Results and Discussion

Profile of the sampled respondents

Table 1 : Profile of the respondents (n=20)

Sl. No.	Variables	Categories	Frequency	Percentage
1.	Age	Young	5	25
		Middle	13	65
		Old	2	10
2.	Gender	Male	9	45
		Female	11	55
3.	Education level	Illiterate	1	5
		Primary	9	45
		Middle school	4	20
		Secondary school	5	25
		Higher secondary	1	5
4.	Experience in Rice farming	<10 Years	3	15
		10-20 Years	13	65
		>20 years	4	20

From the Table 1, it is observed that more than half (65%) of the respondents fall under middle age and 55 percent of the respondents were female. Higher percentage (45%) of the respondents fall under middle school of education.

The majority (65%) of the respondents have an experience of 10-20 years in rice farming. This finding suggests that the study sample comprises individuals with considerable experience in rice cultivation. This level of experience could influence decision-making processes, adoption of innovative practices, and overall productivity in rice farming.

Level of awareness

Referring to the Figure no. 1, it could be unveiled that more than fifty five percent (55.00%) of the respondents had 'Low level of awareness' as compared to the forty five percent of the respondents who had 'High level of awareness' on Integrated Disease Management (IDM) on control of Rice Blast. Due to lack of information dissemination, it's possible that the information about integrated disease management for rice blast control has not been effectively communicated to farmers. This could be due to limited extension services, insufficient outreach programs or inadequate dissemination channels reaching farmers, especially those in remote or marginalized areas.

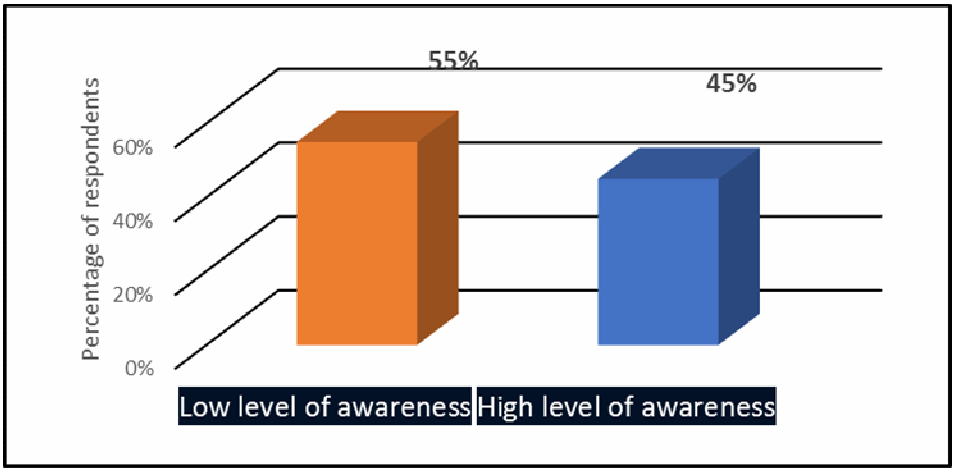

Fig. 1: Level of awareness

Creation of Artificial Intelligent Multi-Media teaching aid for IDM of Rice Blast a.k.a. AI4CORB.

Utilizing the innovative capabilities of DALL-E and ChatGPT-4, AI4CORB (Artificial Intelligent Multi-Media teaching aid for Integrated Disease Management of Rice Blast) was created. AI4CORB deliver a comprehensive guide in just 2.22 minutes about integrated disease management of rice blast. By

leveraging various prompts through ChatGPT-4 and image creation through DALL-E.3. AI4CORB was created with an intention to enhance the understanding of the farmers regarding the integrated disease management of Rice blast. AI4CORB illuminates the identification, comprehension, and mitigation of rice blast disease. This multimedia tool transcends traditional educational methods by integrating diverse media formats, including images and text, making the learning process engaging and accessible. Through vivid visuals and explanatory narration, farmers can swiftly recognize symptoms of rice blast disease and grasp effective strategies for disease control.

AI4CORB's concise yet informative format ensures that critical information is delivered efficiently, catering to the busy schedules of farmers. By harnessing the power of artificial intelligence, it empowers farmers with knowledge, enabling them to safeguard their crops effectively.

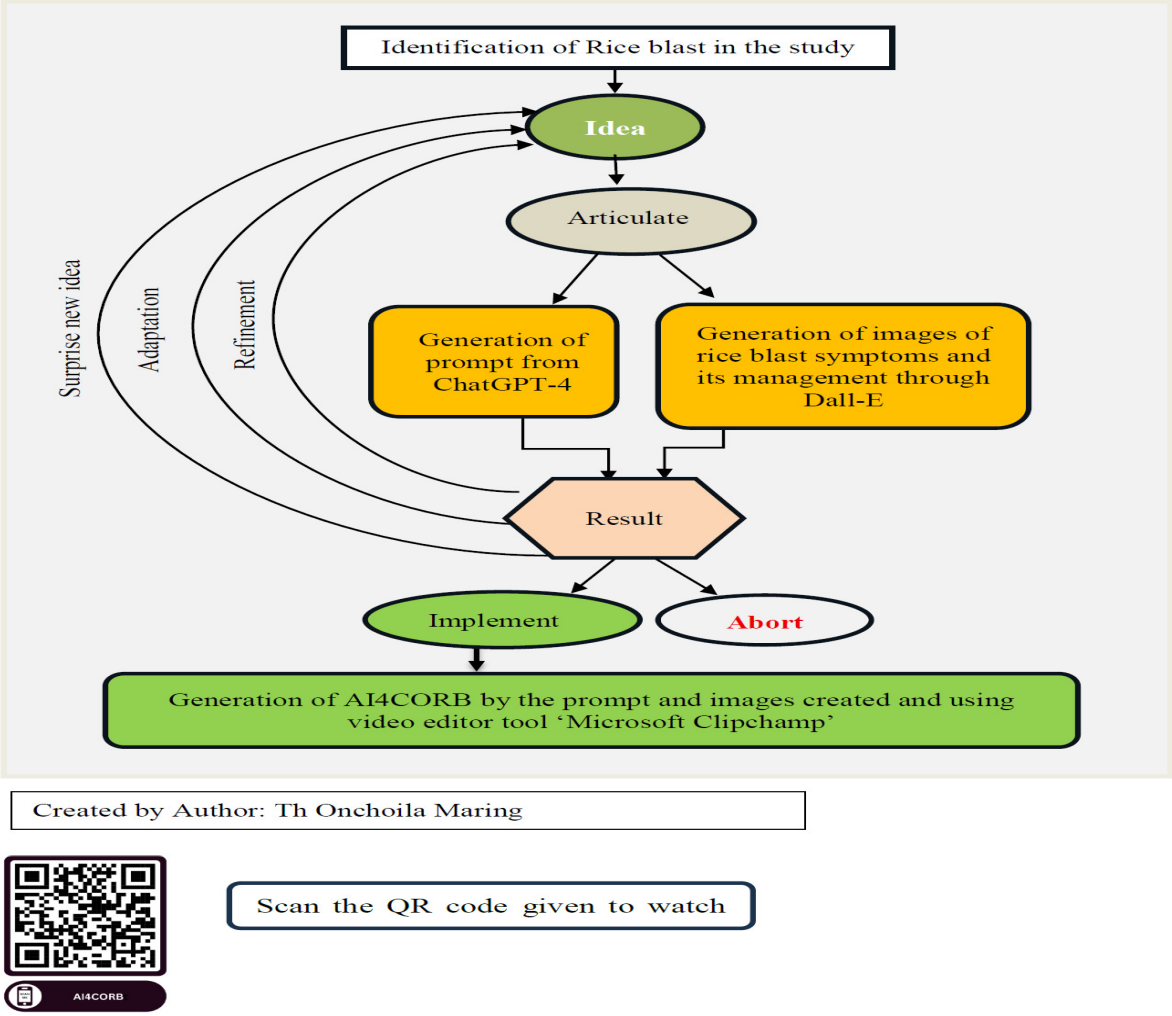

Fig. 2: The following modus-operandi have been followed in creating the AI4CORB

Hypothesis testing

H_0: There is no significant difference in the score of the respondents before and after the application of AI4CORB.

H_1: There is significant difference in the score of the respondents before and after the application of AI4CORB.

Table 2 : Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The median of differences between Pre and Intervention and Post Intervention equals 0.	Related-Samples Wilcoxon Signed Rank Test	.000	Reject the null hypothesis

Significant @ 0.01

The analysis yields compelling evidence to reject the null hypothesis, indicating a significant disparity between the pre-intervention and post-intervention phases of AI4CORB implementation. This suggests that the introduction and utilization of AI4CORB as a teaching aid for Integrated Disease Management (IDM) of Rice Blast have meaningful changes.

The rejection of the null hypothesis underscores the efficacy of AI4CORB in positively impacting the target audience in their understanding and handling of rice blast disease. The discernible difference observed between the pre- and post-intervention phases implies that AI4CORB has effectively bridged knowledge gaps, enhanced awareness, or improved skills related to disease identification and control. This outcome validates the utility and relevance of AI4CORB as a multimedia teaching tool, affirming its potential to contribute significantly to agricultural education and practice.

Table 3: Wilcoxon Signed-Rank Test Results for Post-Pre Comparisons

		N	**Mean Rank**	**Sum of Ranks**
Post-Pre	Negative Ranks	1	1.50	1.50
	Positive Rank	19[a]	10.97	208.50
	Ties	0		
	Total	20		

Table no. 3 provides compelling evidence of the positive effect stemming from the intervention of AI4CORB in the context of Integrated Disease Management (IDM) for rice blast. The observation that the sum of the positive difference ranks exceeds the sum of the negative difference ranks underscores the beneficial influence of AI4CORB on respondents' knowledge and understanding. The positive difference ranks indicate instances where respondents' scores improved after exposure to AI4CORB, reflecting a clear enhancement in their comprehension and awareness of IDM strategies for rice blast disease. Conversely, the negative difference ranks represent cases where scores declined post-intervention, signaling a potential decrease in understanding, although it's notable that their sum is outweighed by the positive differences. This disparity between the positive and negative difference ranks suggests an overall positive trend resulting from the intervention of AI4CORB. The larger sum of positive differences signifies that a majority of respondents experienced an improvement in their knowledge and skills related to rice blast disease management after engaging with AI4CORB.

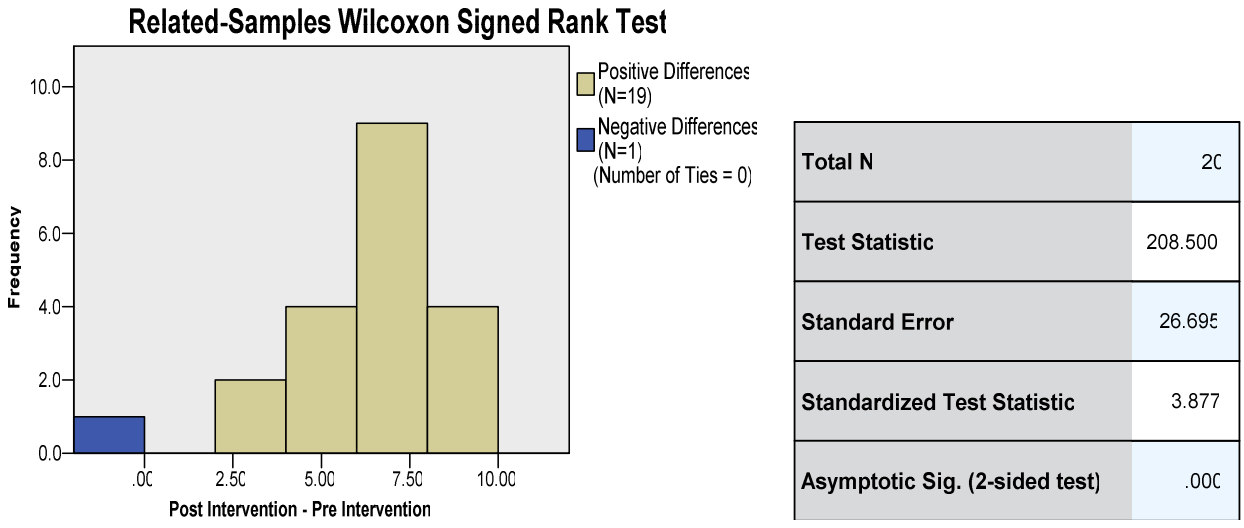

Fig. 3: Related samples Wilcoxon Signed Rank Test

The results of the analysis clearly demonstrate a noteworthy disparity in the scores of respondents before and after exposure to AI4CORB, indicating a substantial impact on their awareness and understanding of Integrated Disease Management (IDM) for rice blast. The discernible increase in

respondents' scores post-intervention suggests a significant improvement in their comprehension and grasp of methods for controlling rice blast disease.

This finding underscores the effectiveness of AI4CORB as an educational tool in enhancing farmers knowledge and skills related to IDM for rice blast. The observed increase in the level of understanding reflects the success of AI4CORB in delivering informative and engaging content, likely through its multimedia approach, which facilitates better retention and comprehension of the subject matter.

The significant effectiveness of AI4CORB on awareness and understanding is indicative of its potential to contribute meaningfully to agricultural education and practice. By equipping participants with the knowledge and strategies necessary for disease management, AI4CORB plays a role in empowering farmers to make informed decisions and implement effective control measures.

Summary & Conclusion

Majority (65%) of the respondents are in middle age groups and 55% of the respondents are female. Higher percentage (40%) of the respondents are in primary level of education. Fifty five percent of the respondents have a low level of awareness on integrated disease management of 'Rice Blast'. Created AI4CORB using ChatGPT +4 and DALL E.3. Significant effectiveness on awareness and understanding on Integrated Disease management of Rice Blast by respondents was observed owing to the intervention of AI4CORB.

Recommendation

The scientific inquiry strongly recommends in establishing training programs for farmers using AI based multi-media tools to enhance immersive learning and understanding of complex-abstract-cognitive domains of farming.

References

Adams, L.C., F. Busch, D. Truhn, M.R. Makowski, H.J. Aerts and Bressem, K.K. (2023). does DALL-E 2 know about radiology? *Journal of Medical Internet Research*, **25**, e43110.

Akter, R. (2019). Efficacy of silver nanoparticles against rice blast disease and farmers perception about its management in Bangladesh.

Balasubramanian, G. (2024). Cutting-Edge Agriculture Technology: Transforming Farming for a Sustainable Future. *European Economic Letters* (EEL), **14**(1): 463-473.

Baul, T., Karlan, D., Toyama, K. and Vasilaky, K. (2024). Improving smallholder agriculture via video-based group extension. *Journal of Development Economics*, 103267.

Cetinic, E. and She, J. (2022). Understanding and Creating Art with AI: Review and Outlook. ACM Transactions on Multimedia Computing, Communications and Applications, 18(2). https://doi.org/10.1145/3475799. Accessed June 25 2023.

Chakraborty, S., Choudhury, N. and Kalita, I. (2022). AI-Based Smart Agriculture Monitoring Using Ground-Based and Remotely Sensed Images. The New Advanced Society: Artificial Intelligence and Industrial Internet of Things Paradigm, 191-221.

Gonzalez, A., Lokanathan, B., Koutsorodi, A., Mathur, A. and Webber, B. (2020). U.S. Patent No. 10,846,843. Washington, DC: U.S. Patent and Trademark Office.

Górriz, J.M., Ramírez, J., Ortíz, A., Martínez-Murcia, F.J., Segovia, F., Suckling, J., Leming, M., Zhang, Y.D., Álvarez-Sánchez, J.R., Bologna, G., Bonomini, P., Casado, F.E., Charte, D., Charte, F., Contreras, R., Cuesta-Infante, A., Duro, R.J., Fernández-Caballero, A, Fernández-Jover, E and Ferrández, J.M. (2020). Artificial intelligence within the interplay between natural and artificial computation: Advances in data science, trends and applications. *Neurocomputing,* **410**: 237–270. https://doi.org/10.1016/j.neucom.2020.05.078 .

Hashim, I., Mamiro, D.P., Mabagala, R.B. and Tefera, T. (2018). Smallholder farmers' knowledge, perception and management of rice blast disease in upland rice production in Tanzania.

Hassain, N. (2018). Role of Multimedia in strengthening agricultural extension services. https://www.researchgate.net/publication/328662704_Role_of_Multimedia_in_strengthening_agricultural_extension_services.

Hassen, J.Y. (2013). The Potential of a Multimedia Open Educational Resource Module in Enhancing Effective Teaching and Learning in a Postgraduate Agricultural Program: Experience From AgShare Project Model. *Journal of Asynchronous Learning Networks*, **17**(2): 51-62.

Iwata, M. (2001). Rice blast control. *Royal Society of Chemistry*, **1**: 3-5.

Kaahwa, M., C. Zhu, M. Muhumuza, R. Mutyebere and C. Karemera. 2019. The Effectiveness of Audio Media in Enhancing Farmers' Knowledge: The Case of Smallholder Banana Farmers in Western Uganda. *International Journal of Recent Contributiond from Engineering, Science and IT*, 7(2): 68-90.

Kega, V.M., Kasina, M., Olubayo, F., Kamau, G.M. and Nderitu, J.H. (2015). A logit analysis of farmer knowledge on rice blast disease Pyricularia grisea [Cook, Sacc] at Mwea irrigation scheme, Kirinyaga County, Central Province, Kenya.

Kerner, S.M. (2023). What is Dall-E? . https://www.techtarget.com/searchenterpriseai/definition/Dall-E.

Lu, Y., Chen, D., Olaniyi, E. and Huang, Y. (2022). Generative adversarial networks (GANs) for image augmentation in agriculture: A systematic review. *Computers and Electronics in Agriculture*, **200**, 107208.

Madokoro, H., Takahashi, K., Yamamoto, S., Nix, S., Chiyonobu, S., Saruta, K. and Sato, K. (2022). Semantic Segmentation of Agricultural Images Based on Style Transfer Using Conditional and Unconditional Generative Adversarial Networks. *Applied Sciences*, **12**(15): 7785.

Matleena, S. (2024). How to Use AI Image Generator to Make Custom Images for Your Site in 2024. https://www. hostinger.in/tutorials/how-to-use-ai-image-generator.

Musebe, R., Watiti, J., Duah, S. and Okuku, I. (2019). Using multimedia campaign approach to improve farmer knowledge on soybean production: A case of selected states in Nigeria. *Journal of Economics and Sustainable Development,* **10**(24): 1-13.

Nath, S., Mondal, B. and Mondal, P. (2020). A Study on the Knowledge Level and Extent of Adoption of Plant Protection Measures against Blast Disease of Rice by the Farmers of Indian Sundarbans. *Annual Research & Review in Biology*, **35**(12), 84-97.

Olori, A.L. and Igbosanu, A.O. (2016). Effect of Computer-Based Multimedia Presentation on Senior Secondary Students' Achievement in Agricultural Science. *Journal of Education and Practice*, **7**(31): 31-38.

Parr, C.S., Lemay, D.G., Owen, C.L., Woodward-Greene, M.J. and Sun, J. (2021). Multimodal AI to improve agriculture. *IT Professional*, **23**(3): 53-57.

Paudi, M.H., Din, R. and Othman, N. (2022). Agricultural Video as A Learning Medium for Young Farmer. *International Journal of Academic Research in Progressive Education and Development*, **11**(1), 729-742.

Ramyashree, R. and AS, V.R. (2022). Application of AI Technology and Image Processing to Smart Agriculture: Detection and Classification of Plant Diseases. In 2022 13th International Conference on Computing Communication and Networking Technologies (ICCCNT) (pp. 1-6). IEEE.

Ringvold, T.A., Strand, I., Haakonsen, P. and Strand, K.S. (2023). AI Text-to-Image Generation in Art and Design Teacher Education: A Creative Tool or a Hindrance to Future Creativity? In The 40th International Pupils' Attitudes Towards Technology Conference Proceedings 2023 (Vol. 1, No. October).

Sahu, R.K., Sharma, M.L., Mooventhan, P. and Khan, M.A. (2022). Effectiveness of the Multimedia Training Module on Farmer's Knowledge in using Bio-control Agents: An Experimental Investigation. *Indian Res. J. Ext. Edu*, **22**(1): 50-54.

Sapkota, R. (2023). Harnessing the Power of AI based Image Generation Model DALLE 2 in Agricultural Settings. arXiv preprint arXiv:2307.08789.

Sharma, G. (2016). Effectiveness of multimedia modules on dissemination of knowledge among the dairy farmers. *J Res Development*, **4**(1): 1-4.

Skamnioti, P. and Gurr, S.J. (2009). Against the grain: safeguarding rice from rice blast disease. *Trends in biotechnology*, **27**(3): 141-150.

Sornapudi, S. (2023). Self-supervised representation learning for digital agriculture. Authorea Preprints

Thomas, D. and Brown, J.S. (2011). A New Culture of Learning: Cultivating the Imagination for a World of Constant Change. Create Space Independent Publishing Platform.

Upadhyay, K. and Bhatta, B. (2020). Rice Blast (Magnaporthe oryzae) Management: A Review. *Agricultural Journal*, **15**(4): 42-48.