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The Impact of Media Literacy on Developing Media Students' Skills in Verifying AI-Generated Images Published on Social Media Platforms

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Abstract:

The research problem is defined by examining the impact of media literacy on the development of media students' skills in verifying AI-generated images, particularly those published on social media platforms. To achieve this, the researcher employed a quasi-experimental methodology, applying a training program to a purposive sample of 30 students-both male and female- enrolled in the Media Department of the College of Arts at the University of Tikrit, Iraq.

The training program aims to enhance media literacy skills, namely: (access, analysis, collective reasoning, and evaluation) These skills are designed to equip the (experimental group) with the ability to verify AI-generated images both (visually and digitally), enabling them to distinguish between synthetic and real images.

The study yielded several notable findings, the most prominent of which is the presence of a (statistically significant difference) between the mean scores of the experimental group in the pre-test and post-test for the (access skill), in favor of the post-test. This result is supported by the fact that the calculated t-value exceeded the tabulated t-value, leading to the rejection of the null hypothesis and the acceptance of the alternative hypothesis.

Additionally, the study found a (statistically significant difference) between the mean scores of the experimental group in the pre-test and post-test for the (analysis skill), again in favor of the post-test. This difference is explained by the fact that the calculated t-value exceeded the tabulated t-value, resulting in the rejection of the null hypothesis and the acceptance of the alternative hypothesis.

This research underscores the critical role of media literacy in empowering students to critically assess and distinguish AI-generated images, particularly in the digital landscape of social media.

Keywords: *Media Literacy, Students' Skills, Verification, Verifying AI-Generated Images, Social Media*

INTRODUCTION

The concept of media literacy reflects an essential aspect of integration between educational and media institutions. Implementing this concept ensures the optimal use of media tools by individuals in alignment with their intended purposes, fostering holistic development on religious, ethical, and scientific levels, among others. Additionally, it contributes to the enhancement of both cognitive and moral competence. In general, most studies on media literacy focus on the skill of interacting with media, as media literacy seeks to empower individuals by enabling them to access, comprehend, interpret, and critically evaluate the content presented by various media platforms. These skills are taught to students from an early age, continuing through their university years, to cultivate awareness and informed media consumption. (Al-Mashaqbeh, 2022)

Media literacy is defined as "the process of empowering individuals within society to critique and refine deceptive media content and navigate it effectively, enabling them to acquire knowledge, understanding,

awareness, and analytical skills for media messages. This allows them to critically evaluate such messages, make informed decisions, and solve problems." (Feud, 2020) It is also described as "equipping individuals with the skills needed to engage with digital media, particularly critical thinking abilities that enable them to distinguish between truth and misinformation, opinion and news. It involves assessing the credibility of digital platforms and social media, identifying their sources, and understanding the priorities shaping their content distribution. Moreover, media literacy instills in audiences the fundamentals of information analysis and textual processing, both quantitatively and qualitatively, providing insights into the explicit and implicit meanings within media content. This comprehensive education extends to various fields of digital media—including electronic journalism, digital broadcasting, and digital television—until individuals gain the ability to create and redistribute content themselves, ultimately reducing the influence of digital media messages on both individuals and society." (Mohammed, 2024)

Social media platforms have enabled the dissemination of false content in various forms, such as fabricated images and misleading news articles that are crafted to appear as legitimate news reports. The objective behind such content is to deceive and mislead users of these platforms. (Salman, 2022)

The Media Literacy Council has identified six types of false content or fake news: (Sedrati, 2021)

1. Satirical Content: This type of content employs humor and sometimes exaggerates sarcasm. The goal is to deceive and influence the audience, although some recipients may not take such news seriously.
2. Misleading Content: This form of content incorporates some actual facts, but they are interpreted in a way that diverges from reality, aligning with the intentions and perspectives of those who disseminate it.
3. False Attribution: In this category, headlines do not correspond to the content presented. The objective behind this manipulation is to attract a larger audience, thereby increasing financial profits.
4. Incorrect Context: The purpose of such content is to deceive the audience by presenting information in a distorted manner.
5. Manipulated Content: This type involves altering and modifying details to mislead the public.
6. Fabricated Content: This is entirely false and fabricated content, which can be highly dangerous if accepted as truth by the audience.

Due to the risks associated with the circulation and dissemination of false content, many countries have sought to implement laws aimed at limiting its spread. Such content has the potential to incite discord and destabilize internal security. However, the enforcement of legal measures is not necessarily an effective solution given the sheer volume of false information disseminated on social media platforms, whether by individuals or through artificial intelligence algorithms capable of generating and distributing large-scale misinformation via fake accounts. As a result, several researchers have adopted theoretical frameworks based on the concept of media literacy. These approaches emphasize awareness among individuals, fostering their critical thinking skills, and strengthening their ability to act as intermediaries in identifying raising and mitigating false content. These theoretical models are founded on the premise that media literacy provides an optimal strategy for confronting the challenges posed by misinformation. (Mekawey, Moayad, & Othman , 2021)

One form of misleading content circulated on social media platforms such as Facebook, X, and Instagram is AI-generated images, which are defined as: “as images produced by generative models that only use text

descriptions as prompts, i.e., all the visual contents are generated from text by AI models". (Li, et al., 2024, p. 4)

The researcher has identified the most significant drawbacks and risks associated with AI-generated images, which are as follows:

a. The spread of misinformation.
b. Threats to the photography profession.
c. Misleading consumers regarding the effectiveness of products.
d. The creation of idealized beauty standards.
e. Failure to represent all segments of society.
f. Violations of intellectual property rights.
g. Bias and the reinforcement of stereotypes.
h. Manipulation of forensic evidence.
i. Use as a tool for defamation and blackmail.

Based on these concerns, it is essential for students to acquire media literacy skills that enable them to critically assess and verify AI-generated images, including the following:

a. Media Access Skills refer to the user's ability to physically access appropriate devices and utilize them at their discretion without restrictions. Additionally, this skill encompasses the user's capacity to engage effectively with relevant software and technology to identify the required information or locate specific content. (Ali, Khalifa , Ameen, & Atta, 2022)

   This skill also encompasses the user's ability to select the appropriate media platform and comprehend the meanings embedded within its content. Certain media tools—such as computers, tablets, mobile phones, and television devices—require a specific level of technical expertise and knowledge. However, physical access to media tools or their messages does not necessarily guarantee effective usage. Numerous studies have emphasized the necessity of additional supporting skills, such as content comprehension, active listening, proficiency in using technological tools, as well as the ability to ask critical questions, gather data and information from multiple sources, and apply acquired information to problem-solving. (Aqila, 2018)

   Studies indicate that media access skills consist of two stages:

   The first stage involves physical access to the tools and platforms that provide digital content, while the second stage pertains to the ability to effectively utilize those tools and digital platforms. (Amin, 2023)

b. The Skill of Analyzing Media Messages: Many researchers consider the skill of analyzing media messages to be one of the essential components of media literacy. This is because the primary objective of media literacy is to enable individuals to exercise critical self-reflection in their relationship with media. Mastery of this skill requires a range of competencies, such as critically examining the content, structure, form, design, and sequence of a media message. This analysis is conducted through the application of literary, artistic, social, economic, and political concepts. (Aqila, 2018)

Moreover, the skill of analysis reflects the recipient's ability to deconstruct a media message into meaningful components. Engaging with a message without analyzing it leads the recipient to perceive only its surface elements, which may result in judging the message based solely on its apparent quality. However, analyzing and delving deeper into the message helps in appreciating its true value and understanding its underlying meanings. The skill of analysis is closely linked to other skills, including comprehension, interpretation, classification, and inference. (Ali, Khalifa , Ameen, & Atta, 2022)

Studies related to media literacy skills have shown that the skill of analysis is influenced by several factors, such as the recipient's awareness of the ideology embedded in digital content, the underlying objectives of that content, as well as the recipient's accumulated knowledge and experiences. (Amin, 2023)

The researcher believes that acquiring this skill is crucial for students, particularly in the context of verifying AI-generated images. Mastering this skill would enable them to critically examine the following aspects:

- Verifying the original account that published the image on social media platforms.
- Inspecting any distortions present within the image.
- Examining the background of the image.

c. The Skill of Digital Collective Reasoning: Reasoning skill refers to the recipient's ability to generate arguments and assumptions, as well as their ability to search for evidence. (Amin, 2023)

As for digital collective reasoning, the researcher defines it as a collaborative thinking process that occurs through the comments of social media users. Some comments contribute to drawing the verifier's attention to distortions that indicate the image is AI-generated, or the audience may highlight, through comments, the presence of illogical contexts within the image — whether temporal, spatial, or otherwise — which can assist in uncovering the truth behind the image. This is particularly important given that commenters often come from diverse backgrounds and possess varying experiences, thus contributing to the formation of collective conclusions that support the verification of AI-generated images.

d. The Skill of Evaluating Media Messages: The evaluation skill contributes to forming judgments regarding the value and quality of media content. This skill enables individuals to compare content against specific standards of values, which may be scientific, ethical, or grounded in democratic principles. (Aqila, 2018)

The evaluation skill is closely tied to critical thinking; recipients who possess this skill are better able to distinguish between true news and fake news or rumors. They are also more capable of differentiating between claims and the relevant or irrelevant reasons associated with the content or subject matter. Moreover, it helps them assess the credibility of news sources and detect any potential bias. This, in turn, enables them to make informed judgments and the correct decisions regarding the published digital content. (Amin, 2023)

Mechanisms for Verifying AI-Generated Images:

The process of verifying images in general requires specific steps and procedures. However, verifying AI-generated images demands additional measures beyond those used for verifying images fabricated through editing software such as Photoshop. This is due to the unique nature of AI-generated images, which differ significantly from images captured by cameras. The researcher found that this type of image verification

requires not only digital verification through the use of digital tools, but also visual verification by observing distortions that may appear within the images. Furthermore, it is essential to evaluate the extent to which the content of the images aligns with logic and reason. Accordingly, the researcher classified the verification mechanisms for this type of image based on media literacy skills, as shown in Table (1):

Table (1): Mechanisms for Verifying AI-Generated Images
Employing the Skill of Access in Verifying AI-Generated Images, which Includes the Following:
- Using reverse image search engines and tools, such as: (Google Image, Bing, Yandex, TinEye) - Using image analysis tools, such as: (Forensically Beta, FotoForensics). - Using AI-generated image verification tools, such as: (Fake Image Detector, Hive Moderation, Sightengine, Wasitai, Illuminarty). - Using ChatGPT to analyze images.
Employing the Skill of Analysis in Verifying AI-Generated Images, which Includes the Following:
- Visually inspecting distortions that may appear in elements such as (people's eyes, human limbs, hair, and other distortions). - Visually inspecting the texts appearing within the images. - Inspecting the signs or logos present in the image. - Analyzing the composition and structure of the image.
The Employment of the (Collective Inference Skill) in Verifying AI-Generated Images, Including the Following:
- Utilizing Social Media Audience Comments on the Images.
The Employment of (Evaluation Skill) in Verifying AI-Generated Images, Including the Following:
- Evaluating the Images in Terms of Their Logical Consistency and Alignment with Science. - Comparing Images of Well-Known Individuals and Places with Authentic Images Published on Credible Websites.

1.1. Research Objectives

a. Assessing the Level of Skills in (Access, Analysis and Collective Inference, and Evaluation) Among the Experimental Sample Students Prior to Implementing the Training Program for Verifying AI-Generated Images.

b. Investigating the Impact of the Training Program for Verifying AI-Generated Images on the Development of Skills in (Access, Analysis and Collective Inference, and Evaluation) Among the Experimental Sample.

1.2. Research Significance

The significance of this study can be outlined in the following key aspects:

a. Scientific Significance: The importance of this research from a scientific perspective lies in the scarcity of prior Arabic studies—according to the researcher—that have examined the impact of

media literacy on verifying AI-generated images. Specifically, this study explores the application of media literacy skills among media students, particularly those in the Faculty of Arts at the University of Tikrit, Iraq. While most studies the researcher has encountered focus generally on verification mechanisms for fake news, no study was found that addresses the verification of AI-generated images, which have recently proliferated across the globe. Therefore, this research holds scientific value as it contributes to the broader field of content verification and, more specifically, the verification of digital images. Moreover, the study's experimental nature adds unique significance to media scholarship, as it investigates the role of media literacy in enhancing students' verification skills, particularly the four core skills—accessing, analyzing, collective reasoning, and evaluating—that enable them to authenticate AI-generated images.

b. Social Significance: In recent years, images have become a source of risk to people's privacy worldwide due to the existence of image manipulation software. However, with the advancements in artificial intelligence, it is now possible to create images that do not exist in reality simply by writing a text through AI tools, which are then converted into images that often resemble reality. This highlights the potential danger of this technology if used negatively, with celebrities being the most common victims of such images. The danger also lies in its ability to affect public opinion, as numerous images have caused crises. A well-known example is the image that was published claiming an explosion had occurred at the Pentagon, which led to a drop in the Wall Street stock market.

1.3. Research Questions

a. What is the impact of media literacy on enhancing media students' skills in verifying AI-generated images?

b. What is the level of skills in (Access, Analysis and Collective Inference, and Evaluation) among the experimental sample students before implementing the training program for verifying AI-generated images?

c. What is the impact of the training program for verifying AI-generated images on the development of skills in (Access, Analysis and Collective Inference, and Evaluation) among the experimental sample

1.4. Hypotheses

a. There is no statistically significant difference at the 0.05 level between the mean scores of the experimental group in the pre-test and post-test for the (accessing) skill.

b. There is no statistically significant difference at the 0.05 level between the mean scores of the experimental group in the pre-test and post-test for the (analyzing) skill.

c. There is no statistically significant difference at the 0.05 level between the mean scores of the experimental group in the pre-test and post-test for the (collective reasoning) skill.

d. There is no statistically significant difference at the 0.05 level between the mean scores of the experimental group in the pre-test and post-test for the (evaluating) skill.

1.5. The Problem of the Study

In recent years, AI-generated images have witnessed widespread proliferation, contributing to the creation of highly imaginative visuals, particularly in the field of design. However, this advancement has not been without its drawbacks, primarily due to the misuse of such technology by users—especially on social media platforms. With the availability of free publishing options and the ease of resharing

images by any user, it has become increasingly simple to mislead the public and fabricate events or situations that never actually occurred.

The danger of AI-generated images lies in their lack of an original source, unlike camera-captured photographs that may be manipulated using specialized software such as Photoshop or images that are taken out of context. This raises critical concerns regarding digital deception, reinforcing the necessity of media literacy in empowering audiences—particularly students—to navigate this evolving landscape. Media literacy plays a pivotal role in enhancing individuals' awareness of AI-generated images by equipping them with verification skills, including (accessing, analyzing, collective reasoning, and evaluating) These core competencies enable students to critically assess digital content, ensuring informed engagement with the vast array of visual information they encounter.

2. Research Method and Sample

A quasi-experimental design was used, as it is the most suitable approach to assess the impact of media literacy on the development of media students' skills in verifying AI-generated images published on social media. The research sample consisted of 30 male and female students from the Department of Media at the College of Arts, University of Tikrit, specifically second-year students for the academic year 2024-2025. This sample was chosen for the following reasons:

- Age Homogeneity: The researcher aimed for the sample to belong to Generation Z.
- Educational Homogeneity: All students are at the same educational level, studying in the media department. They have all taken the course in Media Literacy in their first year, meaning their prior knowledge is similar.

3. Steps for Implementing the Training Program

- Conducting the Pre-test: The pre-test was conducted on the sample students to assess their level of media literacy skills before the implementation of the training program for verifying AI-generated images. It is worth noting that both the program and the test were prepared by the researcher.
- Starting the Training Sessions: The experimental group was subjected to 10 lectures, during which the researcher presented lectures on verifying AI-generated images based on media literacy skills. In most of the lectures, a theoretical presentation of the topic was given, followed by practical demonstrations.
- Final Step - Post-test: After completing the lectures, the post-test was administered to the sample students, and the results were then extracted.

4. Research Results

(A) First Hypothesis: There is no statistically significant difference at the 0.05 level between the mean scores of the experimental group in the pre-test and post-test for the access skill. To test this hypothesis, the researcher used the paired t-test after ensuring that the distribution of scores followed a normal distribution. The skewness values were both below 1, as shown in Table 2.

Table (2) Paired t-test to Determine the Difference Between the Mean Scores of the Experimental Group in the Pre-test and Post-test for the Access Skill								
Test	n.	Arithmetic Mean	Standard Deviation	Skewness	Calculated T-value	Tabulated T-value	Significance	Effect Size
Pre-test	30	2.87	1.01	0.13	6.24	1.96	Significant	very high
Post-test	30	4.47	1.17					

The above result indicates that there is a statistically significant difference between the mean scores of the experimental group in the pre-test and post-test of the skill of accessing information, favoring the post-test. This is due to the calculated t-value being higher than the tabulated t-value. Therefore, the null hypothesis is rejected, and the alternative hypothesis is accepted. The effect size coefficient reached (1.14), which is considered very large.

(B) Hypothesis 2: There is no statistically significant difference at the 0.05 level between the mean scores of the experimental group in the pre-test and post-test of the analysis skill.

To test this hypothesis, the researcher used the paired-sample t-test, after verifying that the distribution of the scores follows a normal distribution. The skewness values were both less than 1, as shown in Table (3)

Table (3) Paired-Sample t-Test to Determine the Difference Between the Mean Scores of the Experimental Group in the Pre-Test and Post-Test of the Analysis Skill								
Test	n.	Arithmetic Mean	Standard Deviation	Skewness	Calculated T-value	Tabulated T-value	Significance	Effect Size
Pre-test	30	2.10	1.06	0.05	5.77	1.96	Significant	very large
Post-test	30	3.77	1.19					

The result in Table (3) indicates that there is a statistically significant difference between the mean scores of the experimental group in the pre-test and post-test of the analysis skill, favoring the post-test. This is because the calculated t-value is higher than the tabulated t-value. Therefore, the null hypothesis is rejected, and the alternative hypothesis is accepted. The effect size coefficient was (1.05), which is considered very large.

(C) Hypothesis 3: There is no statistically significant difference at the 0.05 level between the mean scores of the experimental group in the pre-test and post-test of the collective inference skill.

To test this hypothesis, the researcher used the paired-sample t-test, after verifying that the distribution of the scores follows a normal distribution. The skewness values were both less than 1, as shown in Table (4).

Table (4) Paired-Sample t-Test to Determine the Difference Between the Mean Scores of the Experimental Group in the Pre-Test and Post-Test of the Collective Inference Skill

Test	n.	Arithmetic Mean	Standard Deviation	Skewness	Calculated T-value	Tabulated T-value	Significance	Effect Size
Pre-test	30	1.27	0.83	0.03	3.07	1.96	Significant	Medium
Post-test	30	1.90	0.80					

The above result indicates that there is a statistically significant difference between the mean scores of the experimental group in the pre-test and post-test of the collective inference skill, favoring the post-test. This is because the calculated t-value is higher than the tabulated t-value. Therefore, the null hypothesis is rejected, and the alternative hypothesis is accepted. The effect size coefficient was (0.56), which is considered moderate.

(D) Hypothesis 4: There is no statistically significant difference at the 0.05 level between the mean scores of the experimental group in the pre-test and post-test of the evaluation skill. To test this hypothesis, the researcher used the paired-sample t-test, after verifying that the distribution of the scores follows a normal distribution. The skewness values were both less than 1, as shown in Table (5).

Table (5) Paired-Sample t-Test to Determine the Difference Between the Mean Scores of the Experimental Group in the Pre-Test and Post-Test of the Evaluation Skill

Test	n.	Arithmetic Mean	Standard Deviation	Skewness	Calculated T-value	Tabulated T-value	Significance	Effect Size
Pre-test	30	1.13	0.82	0.76	4.88	1.96	Significant	very large
Post-test	30	2	0.45					

The above result indicates that there is a statistically significant difference between the mean scores of the experimental group in the pre-test and post-test of the evaluation skill, favoring the post-test. This is because the calculated t-value is higher than the tabulated t-value. Therefore, the null hypothesis is rejected, and the alternative hypothesis is accepted. The effect size coefficient was (0.89), which is considered very large.

DISCUSSION OF THE RESULTS

1. The researcher believes that the reason behind the high effect size (in the skill of access) might be that the students in the sample had previously studied a topic related to content verification within the Media Education course during the first year. The topic was connected to the skill of access, particularly with the use of "reverse search tools" and how to use these tools when verifying images and determining their original publication date and time. This result underscores the necessity of integrating basic media literacy skills (cognitively and practically) into the curricula for media students. Combining cognitive knowledge with practical training enhances students' understanding and consolidates skills. Additionally, repeated learning in different contexts helps solidify information and improve performance and application skills.

2. The researcher attributes the high effect size (in the skill of analysis) to the fact that, although the students had not studied the method of using the analysis skill in the context of verifying AI-generated images, the experiment stimulated critical thinking among the students. It enabled them to detect distortions, notice marks and signatures on images, and identify pictures with exaggerated brightness typical of this type of image. The experimental environment provided them with a practical application for analyzing AI-generated images, encouraging students to use their mental abilities effectively to understand and interpret visual content. Analysis is not necessarily content that is taught but rather a skill that develops through interaction with real-world situations and tasks that require critical thinking. The use of AI-generated images containing distortions encouraged students to think and discover, indirectly strengthening their analysis skills. Additionally, when students are assigned unfamiliar tasks outside the lesson's scope, it activates their higher-order thinking processes, leading them to observe details and search for evidence. Connecting analysis to a real-world problem, such as verifying AI-generated images, helps students realize the importance of the skill and encourages them to engage in it with focus and seriousness. The researcher observed that most students had untapped potential, and the experiment provided them with the appropriate environment to activate these abilities, resulting in strong outcomes in analysis.

3. The researcher believes that the effect size for the skill of collective inference was moderate among the experimental group, as it is a higher-order skill that requires time and repeated practice to develop, especially when used in complex contexts such as audience comments that may be contradictory or unclear. Students might hesitate to rely on these comments due to a lack of trust in their credibility or difficulty distinguishing between opinion and fact, which makes them either approach the comments with excessive caution or ignore them entirely. On the other hand, comments can be very useful when users point out distortions in image details, such as deformed edges or teeth, or distortions in the background, among others. The audience may also directly indicate that the image is fake and refer to the tool or program used to detect this type of image. Furthermore, the audience may mention that the specialized organizations for verifying fake content have pointed out that the image is not real or is AI-generated. Therefore, the audience must be aware when reading such comments and benefit from the observations provided within them.

4. The researcher attributes the high effect size (in the skill of evaluation) to the fact that it was the last skill taught to the students after access, analysis, and collective inference skills. This reinforced the depth of understanding and accuracy in making judgments among the students. The sequential development of these skills helped prepare the students to engage with media content using an integrated critical mindset, starting with deconstructing the content, analyzing its

components, extracting evidence, and finally evaluating its credibility or alignment with reason, logic, and reality. This highlights the importance of a structured teaching plan in effectively developing media literacy skills.

CONCLUSIONS

1. The researcher found that there are many media literacy skills; however, the most useful skills in the field of verifying AI-generated images are: (access, analysis, collective inference, and evaluation).
2. The researcher found that, despite the high quality of AI-generated images, which initially seem highly realistic, focusing on their details enables the audience to detect them by utilizing media literacy skills, particularly the skills of (access, analysis, collective inference, and evaluation).
3. The researcher found that education based on practical application and experimentation in developing media literacy skills is extremely important, even for those with prior knowledge. Additionally, higher cognitive skills, such as analysis, evaluation, and inference, require focused educational interventions and training within interactive environments that simulate real-world media scenarios.
4. Studying media literacy skills theoretically is insufficient for achieving the desired impact in verifying AI-generated images. Instead, it is necessary to rely on the practical aspect to achieve a significant impact.

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