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Advancing Visual Literacy: Innovative Use of Artificial Intelligence Generated Meme Images as an Effective Tool in the Context of Media Communication

Abstract

This article explores research into the use of meme images generated by artificial intelligence as a means of media communication in the context of students oriented to work in the cultural and creative industries sector. The aim of the primary descriptive research is to analyse the ability of future cultural and creative professionals in the context of visual literacy to distinguish the source of content, i. e. to identify whether a given image comes from an artificially intelligent system or from a human user. The paper registers the impact of these technological tools on students' communication skills and creative potential and evaluates the possibilities of their integration into the educational process. Furthermore, this research provides insight into how emerging technologies, like AI, could be integrated into educational processes to support innovative teaching methods. By assessing the benefits and challenges of incorporating AI-generated content in academic environments, the study highlights the importance of preparing students for a future

where AI is a key element of media communication. This perspective underscores the role of educational institutions in equipping students with the skills to critically engage with and leverage AI tools, thus fostering a media-savvy and adaptable workforce ready for the demands of the cultural and creative industries. The findings of this research will contribute to understanding the impact of AI on student competencies in media communication, offering a valuable resource for academics and educators seeking to integrate new technologies into their teaching practices.

Key words

Artificial Intelligence. Cultural and Creative Industries. Innovative Applications. Media Communication. Meme Images. Visual Literacy.

Introduction

In today's digital era, media communication is constantly evolving and adapting to new technological trends. One such development is the use of meme images, which are often generated by artificial intelligence, as a means of expressing moods, thoughts and reactions. In the context of students aiming to work in the cultural and creative industries sector, it is important to understand how these new forms of media communication affect their ability to understand and create content.

The aim of this paper is to evaluate the impact of AI-generated meme images on students' communication skills and creative potential. The primary descriptive research focuses on analyzing students' visual literacy and ability to distinguish the source of content, whether it is the work of an AI or a human creator. This research not only provides important insights into the current state of education in the cultural and creative industries, but also offers a perspective on innovative applications of technology in academic settings.

Based on the results of this research, we can better understand how to integrate technological tools into the educational process and how to support students in developing their communication skills within the current media environment.

1 Current State of Professional Reflection and Research on the Issue

The research by Díaz (2013) aims to establish a formal definition of "Internet Meme" for use in academic fields such as social sciences, communication studies, and the humanities. It critically examines and compares various interpretations of the term "meme", leading to a modern concept that integrates the views of different meme theorists. The study identifies two types of memes under current definitions: the meme-gene and the meme-virus. By combining the meme-virus characteristics with definitions of IM from the Internet and communication theories, a formal characterization of the concept is developed. Finally, the application of this developed concept for characterization and research is demonstrated through the analysis of two internet memes.

In Kanai's (2016) article, how the gendered, racial, and class-based practices of reading a humorous meme on Tumblr shape forms of social interaction and belonging is examined. Focusing on the anonymous Tumblr blog "WhatShouldWeCallMe", the meme expresses emotions and reactions related to the everyday experiences of young, Western women using captions and GIF images. Utilizing the feminist Cultural Studies tradition of text-reader analysis and New Literacy Studies approaches, the article suggests that engaging with the meme requires a collective set of competencies and knowledge

rather than individual ones. The term "spectatorial girlfriendship" is introduced to describe how the meme's texts compel readers to use gendered, class-based, and racial knowledge to create social connections. The joke in the meme is understood by aligning seemingly mismatched GIFs and captions, remixing and matching existing classifications of people, bodies, and objects. The concept of spectatorial girlfriendship highlights how gender, class, and race are arranged and interacted with, often reflecting social inequalities without explicitly acknowledging them. The bodies in the GIFs are treated as "stock" images for selective reinterpretation. While the meme provides a sense of shared feminine understanding, participation is structured unequally, extending beyond simply interpreting the GIF and caption. The meme favours an ideal reader shaped by postrace, postfeminist views on the usability of gender, race, and class.

The study by Nissenbaum and Shifman (2018) investigates cultural globalization through the lens of meme templates, viewing them as expressive tools that both enable and constrain expression. They analyzed global and local aspects of mainstream meme culture by tracing the top 100 templates in meme generators in English, German, Spanish, and Chinese, using 10 examples to represent each (totaling 4,000). Using both quantitative and qualitative methods, they explored the forms, social identities, and emotions embedded in these

templates. Their results showed that while American/Western pop culture dominates meme templates, local templates, particularly in Chinese, are also present. Generally, memes tend to be socially conservative but emotionally disruptive, adhering to dominant representation patterns while leaning towards negative emotions, with anger as a significant anchor and happiness often expressed ironically. Additionally, their findings revealed an individualism-collectivism paradox, where the emotions in memes appear to contradict existing literature on cultural values.

We decided to illustrate the undeniable topicality and perspective of research in the field of visual literacy in the context of innovative use of meme images generated by artificial intelligence as an effective tool in the field of media communication in the above-mentioned contexts, by quantifying the interest of the global scientific community in the subject matter in the form of the development of the number of scientific reflections and research over the last decade (2013 – 2023) in the two most important scientific databases, Web of Science (WoS) and Scopus.

From the statistical data, the growth of interest in the scientific community in the Internet meme issue over the last ten years is evident. In total, 668 (Scopus) and up to 1,179 (WoS) scientific articles, monographs and reviews directly devoted to the issue of visual

communication through Internet meme images can be found in the databases in question over the period in question. The above number of papers would be higher, but we have specified the presented selection by applying functional filters to the search results. We have concentrated on scholarly reflexives in the areas of Communication, Computer Science, Linguistic, Art Humanities, Cultural Studies, Sociology, Humanities, Political Studies, Philosophy, Film Radio and TV, Telecommunication, and Ethics et cetera.

As part of the exploration of knowledge in the investigated issue of “internet meme” and AI, we have conducted a probe of professional and scientific publications in the scientific database Web of Science, using the efficient tool VOSviewer. We targeted that database because it contained a numerically more robust sample of scholarly reflections than the Scopus database during the period under study. Monitoring the most frequently used keywords and phrases in published studies that dealt with communication via “internet meme” over the last decade (2013 – 2023), we register a frequent occurrence of phrases such as “internet meme” in particular, “meme”, “memetics”, “media”, “humour”, “virality”, “participatory culture”, “critical discourse analysis”, but also “mental health”, “legal language” or “digital culture”, which are certainly closely related to the topic of communication, AI and “internet meme”. See more in Fig. 1.

Internet memes illustrate the trend of replicability and dissemination of discourses within today’s participatory culture. Typically, memes are humorous pieces of content that proliferate online, being replicated or modified and then shared with others. However, the paper by Yus (2018) shifts the focus from their humour to how each stage of meme communication affects the user’s self-concept, self-awareness, and overall identity. It explores five stages of meme communication and examines how each stage can potentially influence the user’s identity (Yus, 2018).

Combining humour with cultural relevance, internet memes have become ubiquitous in the digital age. Dawkins (2018), in his book *The Selfish Gene*, likened memes to cultural genes, noting how they propagate and evolve through processes of ‘mutation’ and ‘inheritance’. On the Internet, memes often trigger cultural biases, sometimes replacing logical argumentation with persuasive humour. Despite their widespread success online, the detection and evolution of memes have not been thoroughly studied. Work by Beskow et al. (2020) introduces and evaluates Meme-Hunter, a multi-modal deep learning model designed to classify images as memes or non-memes, comparing its performance to uni-modal approaches. They use image similarity, meme-specific optical character recognition, and face detection to identify and analyze families of memes shared on

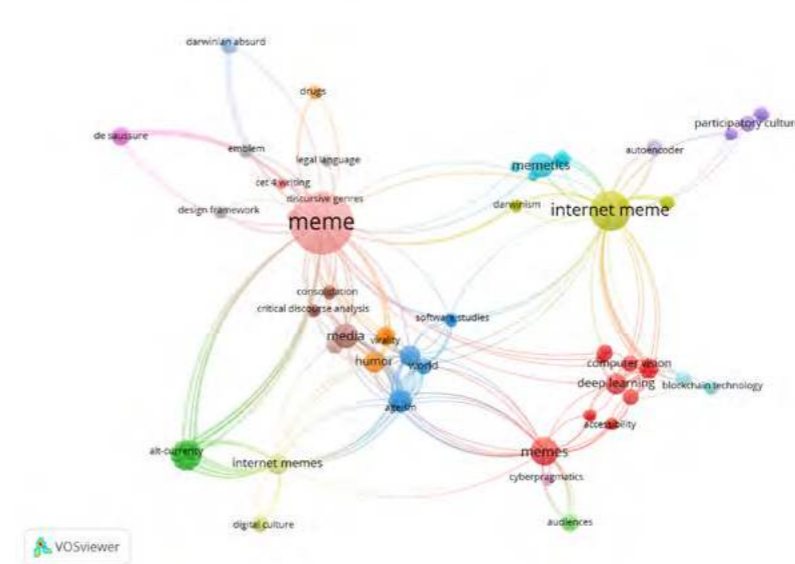


Figure 1: Frequency and correlations of keywords in scientific articles in the WoS database during the periods 2013 – 2023, 2024.

Source: own processing, 2024

Twitter during the 2018 US Mid-term elections. By tracking meme mutations within the electoral process, this study supports Dawkins’ concept of meme evolution.

The article by Dementieva (2018) considers the topical phenomenon of the media meme and its functioning in modern society. The author gives a more complete description of the stages of the life of the meme, which has changed during the period of universal informatization. The meme life consists of its emergence, development, assimilation, preservation, expression, expansion, extinction and rebirth. The individual, group and global stages of meme introduction into the social environment are considered. The study gives the author’s typology of

media memes with examples. The concept “nomadic meme”, which is the totality of all or most types of memes, is first introduced into scientific use. The author analyzes the features of vocabulary and design of modern media memes, and deduces the formula for their viability in the media space (attracting the attention of the audience, ability to evoke strong emotions, conciseness, reliance on memes already fixed in the minds of the audience). Citing examples of positive and negative, strong and weak memes distributed by politicians, the media, and the internet community, the author concludes that it is important to create strong meme complexes for a stable functioning of a multi-ethnic society. In the article, a study is conducted on the distribution of memes in the media that unite and

dissociate a multi-ethnic society. It is already possible to talk about the topicality of journalistic work on the creation and implementation of positive memes that cause the mental state of ethnic unity. The negative meme “person of a Caucasian nationality” has almost disappeared in the media, which speaks about the greater caution of media workers and the control over this topic at the legislative level. However, the meme “Caucasian as a violator of the law” is still often found in the media. Media memes about the ethnic groups of Tatars, Chukchi, Jews are also considered. Currently, the media is dominated by negative memes, dissociating ethnic groups in Russia. They are based primarily on stereotypes, and then broadcast and developed by the media. Positive memes on the national theme are less fertile so far, they do not go beyond the group stage, and do not meet the conditions of the viability of the media meme. In this connection, the meme is rapidly fading away, and it is poorly fixed in the consciousness of society. However, over the past 10 years, the changes that have taken place in society and journalism have led to conscious attempts to produce high-quality media products, to the development of certain skills of journalists who specifically create and launch media memes that can compete with the already widespread ideas and can consolidate a multi-ethnic community. Therefore, the functioning of the media meme can be viewed from a positive point of view. And work on creating a single

multi-ethnic society will continue, including at the level of the work of journalists.

Xu et al. (2022) claims that memes have emerged as a widely used method of communication among internet users globally. Deciphering internet memes is one of the most challenging aspects of natural language processing (NLP) because of their informal writing styles and unique online terminology. Recently, many linguists have pointed out that memes carry significant metaphorical content. However, current research tends to overlook this important characteristic.

2 Methodology

The main research topic of the paper was the use of meme images generated by artificial intelligence as a means of media communication in the context of students oriented to work in the cultural and creative industries sector. Within the intent of the research topic, we set the following research problems:

- The ability of future professionals in the cultural and creative industries to distinguish between content generated by artificial intelligence and content created by human users.
- Lack of best practices and methodologies for integrating AI tools into the educational process in the cultural and creative industries.
- The use of innovative applications with integrated artificial intelligence in academic environments.

The aim of the research was to find out:

- Can students oriented to work in the cultural and creative industries sector distinguish, in their visual literacy, whether a meme image comes from an artificial intelligence system or from a human user?
- What are the possibilities of integrating AI tools that generate meme images into the educational process in the cultural and creative industries?
- What innovative applications with integrated artificial intelligence can be used in academia for media communication?

The first stage was to create some model situations that would be suitable for processing into smiley meme images. In the context of the scope of the paper, we chose a total of 4 situations. Each of the abstractions mentioned above was created by us through the website imgflip.com. We made the choice conditional on the tool being completely free (no registration required), having a larger database of images available, being able to add and edit our own text, and allowing sharing of the meme image thus generated.

imgflip.com is a website dedicated to creating and sharing memes, GIFs and other visual content. Users can upload their own images or use the available templates to which they can add text and other graphic elements, resulting in various forms of creative visual content. In addition to meme creation, the site also provides tools for creating GIFs from videos or series of images. [imgflip](https://imgflip.com) offers intuitive editing tools,

making it an attractive platform for users who want to generate and distribute quickly and easily. The site has potential for use in the digital communications or cultural and creative industries.

As a tool for generating meme images we have chosen the DALL-E 3 generator. The tool is currently available only as a paid version. The latest version, DALL-E 3, represents another significant step forward in the field of generating images from text descriptions. A more advanced architecture combined with innovations from the previous version has produced even more realistic and detailed images. DALL-E 3 features improved ability to understand and interpret complex text descriptions, improved control over the style and content of generated images, and the ability to create dynamic scenes and complex compositions (David, 2023).

Initially, we oriented the input of instructions to Slovak, but during the actual generation of the resulting meme images (scenes), we were forced to switch to communicating exclusively in English. In the following sections of the paper, we explain the reasons for this.

3 Results

We chose a koala eating eucalyptus leaves with a surprised expression as the subject for the scene of the first picture. For the text we chose the phrasing, “Ked’ pozriem do vzdelávania a zajtra mám skúšku”.



Figure 2: A series of images with Slovak text, where the first one is created using the imgflip.com tool. The remaining ones are generated by artificial intelligence.

Source: own processing, 2024

The scene on the far left was created using the website imgflip.com. The remaining three images were created gradually by entering the following instructions:

- Generate a meme image: a surprised koala climbing on a tree trunk, eating eucalyptus leaves. Image text: “Ked’ pozriem do vzdelávania a zajtra mám skúšku”.
- Generate meme image: a surprised koala climbing on a tree trunk eating eucalyptus leaves. Text in English on the picture: “Ked’ pozriem do vzdelávania a zajtra mám skúšku”.
- Generate meme image: a surprised

koala climbing on a tree trunk eating eucalyptus leaves. The literal text in the picture will be: “Ked’ pozriem do vzdelávania a zajtra mám skúšku”.

As we can identify, the image of the koala is generated with identical content, but the problem arises when generating the text inserted into the image. This phenomenon sets in all model abstractions and we could not design such an instruction that the text defined by us is grammatically and stylistically correct. For this reason, we decided to switch and communicate exclusively in English henceforth.

The resulting representation was created by entering the following instructions:

- Generate a meme image: a surprised koala climbing on a tree trunk, eating eucalyptus leaves. The literal text on the picture will be: “when I’m looking into education portal and I have an exam tomorrow”.
- Text in image is not correct. Fix it, please.
- Now you have only one mistake in word PORTAL. The “A” letter is incorrect.



Figure 3: A series of images with English text, where the first one is created using the imgflip.com tool. The remaining ones are generated by artificial intelligence.

Source: own processing, 2024



Figure 4: A series of images with English text, where the first one is created using the imgflip.com tool. The remaining ones are generated by artificial intelligence.

Source: own processing, 2024

Due to the scope of the paper, we will not detail the instructions for generating the images. We will present a series of images, where the first will be generated by the authors and the imgflip.com website. The next represent the graphical outputs based on the specified instructions. The first commands for generating the content were as follows:

- Generate a meme image: a man in a suit presenting a medal to himself. Text on the picture: "I said something on the exam that's a C".
- Generate a meme image: dancing third world children. The literal text in the picture will be: "Students after passing the exam".
- Generate meme image: confused pirate captain. Text on the picture:

"When you didn't listen in the exercises and you have to hand in the assignment".

Based on the work and the individual outputs, we can identify the main problem with the advanced generative AI model. This is the generation of text as a graphical element. In the context of language mutation (use of SK - language) when entering instructions, and correction instructions, there were noticeable shortcomings in the generation of characters with accents. However, we must not forget that the Slovak alphabet consists of 46 letters, namely 32 consonants and 14 vowels. The English alphabet consists of only 26 characters (these are part of the

Slovak alphabet). On the basis of the cumulative number, it is logical to consider the higher difficulty of generating such a structured text. Of course, one of the main technical constraints in generating graphical content is resolution and accuracy. Generative AI models are designed to recognize and replicate patterns, but text features require extremely high accuracy in rendering letter shapes and their alignment. Even small errors in rendering letters can lead to illegibility of text, which is highly undesirable. These errors can also be seen in our generated scenes where, especially for Slovak text, the algorithm generates text with deformed or incomplete characters. In the context of a more perfect generation for the English



Figure 5: A series of images with English text, where the first one is created using the imgflip.com tool. The remaining ones are generated by artificial intelligence.

Source: own processing, 2024



Figure 6: A series of images with English text, where the first one is created using the imgflip.com tool. The remaining ones are generated by artificial intelligence.

Source: own processing, 2024

text, it is reasonable to consider that this fact could have been caused by, e.g., an insufficient training set.

4 Preparation of the Questionnaire Method

The aim of this study is to investigate how different factors affect students' ability to identify meme images generated by artificial intelligence. We chose the questionnaire method based on its positive features in the context of its rapid distribution, time and direct cost savings, flexibility of the questions asked, relative ease of data processing, anonymity, and ability to use multimedia content.

Before defining the different hypotheses, we turn our attention to the profile of the respondent. We will determine the admissible set. The assumed respondents will be students of the Department of Media and Cultural Heritage, Faculty of Humanities, at the University of Žilina. The students of this department were chosen

because of their professional focus and potentially greater familiarity with digital media and artificial intelligence. Based on the identified target group, it is necessary to adjust the demographic characteristics that will need to be collected. As age category is not entirely relevant, it is more appropriate to query the year of study (1 - 5). In parallel, the studies in the department are categorised into three main streams (media management, cultural heritage, digital humanities).

Here, the first paradigm for defining hypotheses emerges, namely the influence of the field of study on the actual identification of the generated meme image by the artificial intelligence as represented by the aforementioned tool. Subsequently, the questions will be oriented towards the identification of which of the above images is generated by artificial intelligence. For each question, we will also collect the respondents' verbal statements based on

which attributes they conditioned their decision. We will analyze these responses after collection in an effort to identify the most frequently occurring responses, or to categorize these responses into content similar/identical classes.

In total, we will ask seven questions, three of which will focus on demographic characteristics. The remaining four questions will be oriented towards identifying AI-generated meme images with a qualitative investigation of the conditional decision.

Based on the previous, we have identified the following hypotheses:

- HOA: The direction of study of students in the Department of Media and Cultural Heritage does not have a significant effect on the identification of meme images generated by artificial intelligence.
- H1A: The direction of study of students in the Department of Mediamatics and Cultural

Heritage has a significant effect on the identification of meme images generated by artificial intelligence.

- H0B: The level of knowledge attainment represented by the length of study in the Department of Mediamatics and Cultural Heritage does not have a significant effect on the identification of meme images generated by artificial intelligence.
- H1B: The level of knowledge attainment represented by the length of study in the Department of Media and Cultural Heritage has a significant effect on the identification of meme images generated by artificial intelligence.

We set the significance level to a statistically highly significant relationship, and thus $\alpha = 0.01$. Verification of the dependence or independence will use the chi-square test.

The data collection is foreseen to take place over the time period from 23. 9. 2024 to 7. 10. 2024. This range represents 14 calendar days. The questionnaire will be developed using Microsoft Forms and distributed via email addresses to all students of the Department of Media and Cultural Heritage, and duplicated through social networks (Facebook and Instagram profiles) of the aforementioned department. This timeframe was determined based on the fact that at the time of writing this article,

the final state exams were taking place during the concurrent exam period, when students orient their efforts towards preparing for these final tests of knowledge. From 23 September 2024, the teaching of the winter semester of the academic year 2024/2025 begins, where the category of interest will be the 1st year students, who come exclusively with knowledge from previous schools, which represents a reflection plane for the collection itself in the context of the second hypothesis.

The results of this survey can contribute to a better understanding of how students of different majors interact with AI technologies, and can provide valuable information for the development of educational programs and communication skills.

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References

Beskow, D. M., Kumar, S., & Carley, K. M. (2020). The evolution of political memes: Detecting and characterizing internet memes with multi-modal deep learning. *Information Processing & Management*, 57(2), 102170. <https://doi.org/10.1016/j.ipm.2019.102170>

David, E. (2023, September 20). *OpenAI releases third version of DALL-E / DALL-E 3 integrates with ChatGPT so users don't have to think*

of prompts anymore. <https://www.theverge.com/2023/9/20/23881241/openai-dalle-third-version-generative-ai>

Dawkins, R. (2018). *The selfish gene*. Oxford University Press.

Dementieva, K. V. (2018). Media meme and its role in the formation of a multi-ethnic society. *Vestník Tomskogo Gosudarstvennogo Universiteta. Filologiya - Tomsk State University Journal of Philology*, (53), 257-278. <https://doi.org/10.17223/19986645/53/17>

Díaz, C. M. C. (2013). Defining and characterizing the concept of internet meme. *Revista CES Psicología*, 6(2), 82-104. <https://www.webofscience.com/wos/woscc/full-record/WOS:000219742100007>

Kanai, A. (2016). Sociality and classification: Reading gender, race, and class in a humorous meme. *Social Media + Society*, 2(4), 1-12. <https://doi.org/10.1177/2056305116672884>

Nissenbaum, A., & Shifman, L. (2018). Meme templates as expressive repertoires in a globalizing world: A cross-linguistic study. *Journal of Computer-Mediated Communication*, 23(5), 294-310. <https://doi.org/10.1093/jcmc/zmy016>

Xu, B., Li, T., Zheng, J., Naseriparsa, M., Zhao, Z., Lin, H., & Xia, F. (2022). MET-meme: A multimodal meme dataset rich in metaphors. In *Sigir'22: Proceedings of the 45th International ACM Sigir Conference on Research and Development in Information Retrieval* (pp. 2887-2899). Association for Computing Machinery. <https://doi.org/10.1145/3477495.3532019>

Yus, F. (2018). Identity-related issues

in meme communication. *Internet Pragmatics*, 1(1), 113-133. <https://doi.org/10.1075/ip.00006.yus>

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Profile of the Authors

Marián Grupač focuses primarily on the area of domestic (Slovak) media production, including the outputs of the so-called new media, in the context of the application or violation of ethical principles and the exposure of information, data and communication platforms in the media space, and also conducts research in the area of the use and use of language in the media, especially in relation to the use of grammatically incorrect forms of language or the occurrence of taboo lexis in media outputs.

Vladimír Filip primarily focuses on the lifespan of digitally born documents, including media longevity, migration, and preservation of digital content. He also works on creating digital multimedia objects, their editing, and presentation in digital environments, as well as knowledge management. Additionally, he addresses the implementation of information and communication technologies in education and the presentation of cultural heritage.

Matej Somr focuses his research on the creative industry, combining years of experience in the media sphere. Among other things, he actively participates in the promotion of the Department of Media and Cultural Heritage and the Faculty of Humanities. Within teaching practice he implements his long experience in media. He also participates in the running of the recording studio of the Faculty of Humanities.

Dominik Maček has been working at the Department of Media and Cultural Heritage as an internal PhD student with a focus on media and historical subjects. In his research activities he is dealing with the issue of Tolerant Churches - Rural Tolerant Churches of the Evangelical Church of Augsburg Confession in Slovakia.

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