



HIGHER EDUCATION IN THE DIGITAL MARKETING AGE: EVALUATING THE COST-EFFECTIVENESS OF INSTAGRAM CAMPAIGN AD FORMATS USING A/B TESTING¹

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Abstract:

In the digital marketing age, higher education institutions are increasingly utilizing social media platforms such as Instagram to enhance their visibility and attract prospective students. This study examines the cost-effectiveness of higher education institutions' Instagram marketing campaigns through A/B testing, focusing on different advertising formats with the same creative approaches. By comparing static images with animated images (in a video file format), the research confirms that carousel ads are more cost-efficient and generate higher engagement rates than Video ads. Specifically, carousel ads achieved significantly higher Click-through rates (CTR) by both impressions and reach, outperforming video ads by a wide margin. The analysis indicates that campaigns using static image format are more cost-effective, demonstrating lower Costs per click (CPC), Cost per landing page view (CPLPV), and Cost per registration (CPR). Moreover, the study emphasizes that carousel posts outperform video ads significantly relating to the return on ad spend (ROAS), with carousel campaigns achieving approximately 29.9% higher returns. The findings underscore the importance of audience segmentation, noting that different age groups and genders respond variably to marketing efforts. Despite some limitations, such as sample size and timeframe, the results validate the study's conclusions and underscore the effectiveness of Carousel posts in strengthening institutional image and engagement. This study offers important insights and perspectives for refining and optimizing Instagram marketing strategies in higher education, that can contribute to increasing enrollment and institutional visibility.

Keywords:

Advertising format, Carousel, Video, Social media, ROAS.

JEL Classification:

I12, M3, O3

INTRODUCTION

In the contemporary digital era, higher education marketing is experiencing a significant transformation. As HEIs compete to attract and engage prospective students, digital marketing has become increasingly dominant. Many authors have highlighted the challenges and openly discussed the costs, benefits, and returns on investment of the social media planning and management process (Wankel & Wankel, 2012).

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Nowadays, these institutions use digital platforms, especially social media like Instagram, to connect with potential students for communication and interaction, providing an engaging way to boost visibility and appeal (Hushain & Kant, 2023). Through visually engaging content, institutions can showcase academic programs, and student achievements, creating a compelling narrative that resonates with prospective students (Smith, Johnson, & Williams, 2018). Therefore, social media platforms have evolved into indispensable channels for higher education institutions. There is still a lack of acceptance of new trends and technological innovations, as employees sometimes refuse to adapt to the changes (Pavlova, 2023). However, with a growing number of people using the internet and smartphones, social media has evolved into an integral aspect of everyday life, particularly for younger individuals. Digital media is known to be a whole lot more cost-efficient, both in terms of establishment and placement of ads, an advantage further supported by detailed analytics and the ability to target people based on their location or demographic parameters (Belačić & Alčaković, 2023). There are over one billion monthly active users, and Instagram, with its visually engaging interface and widespread popularity among younger generations, serves as an optimal platform for higher education institutions to connect with and attract high school students and young adults. This shift in behavior underscores the importance of having a strong digital presence (Nikolić, 2023) to attract and engage potential students. Recent research indicates that there were 4.39 million users aged 18 and above using social media in Serbia, which was equivalent to 74.6% of the total population at that age (Kemp, 2024).

In Serbia, limited budgets make it difficult to implement effective marketing strategies. Serbian higher education institutions, like many others around the world, are facing challenges in creating cost-effective marketing strategies to attract students. The digital revolution marked a turning point in the history of education (Radojević Aleksić & Moretić Mičić, 2024). Moreover, Serbian higher education institutions compete not only with each other but also with institutions across Europe and beyond. The pressure to attract prospective students, influenced by demographic shifts and economic factors, has pushed institutions to seek more innovative and cost-effective marketing solutions. To measure effectiveness, institutions often utilize ad-attributed metrics to analyze return on advertising spend (ROAS) across different marketing channels (Qin & Pauwels, 2023). The rapid and progressive advancement of modern digital technologies and tools, as well as their widespread application, have changed the working environment and working conditions (Nikolić, 2023).

Instagram's potential in the higher education recruitment process is enormous. The platform's visual nature allows institutions to create and share content that is not only informative but also emotionally resonant. This is particularly important in the context of higher education, where prospective students are making significant life decisions based on the information they receive. Instagram enables universities to tell their stories in a way that is both engaging and persuasive, helping to build a connection with potential students long before they apply. This can directly impact institutional success and influence educational policies (Paladan, 2018). Often, paid advertising on Instagram is a popular solution. Still, the issue is that the platform provides various advertising options, including static image posts, Carousel posts, and video ads. It is not always clear which format offers the highest return on ad spend (ROAS) under constrained budgets (Evans & Coolson, 2019). This question is particularly relevant for Serbian higher education institutions, where marketing resources are often limited, and every spending must be justified.



This research addresses the urgent need to evaluate Instagram marketing campaigns' effectiveness (Cassidy, Faucher, & Jackson, 2018) for higher education institutions in Serbia. The research employs A/B testing on the Instagram platform to compare two distinct advertising formats with the same creative approaches: static images presented in a carousel post format and a 17-second animated video advertisement with audio narration. By examining the performance of these two formats, this study aims to provide a direct comparison currently underexplored in existing literature, particularly within the context of the Serbian market. This research topic is particularly significant as it provides practical guidelines for institutions striving to optimize their marketing campaigns with limited budgets, aiming for better results (Evans & Coolson, 2019). Existing literature contains some studies addressing the use of social media in the context of higher education; however, there is a lack of literature focusing on identifying and analyzing direct comparisons of creative approaches and campaign effectiveness through A/B testing, specifically tailored to the Serbian market (Paladan, 2018). Through systematic analysis of the results of this research, significant insights are gained as to which type of format for a paid marketing campaign (static image vs. video) with the same creative approach generates better results (Evans & Coolson, 2019). These findings provide higher education institutions with actionable information to guide their marketing resources and improve strategies for effectively attracting students.

LITERATURE REVIEW

While numerous studies have explored the effectiveness of digital marketing strategies in higher education, only several studies have investigated the cost-effectiveness of social media marketing campaigns within higher education (Revillard, 2022; A. E. C. Team, 2022; Alkarablieh, A., & Khraim, H. 2015). There is a notable gap in research specifically studying the effectiveness of various ad formats in digital marketing campaigns through A/B testing for ad optimization (Quin, Weyns, Galster, & Costa Silva, 2024; Faisal, Naseer, & Akram, 2023, Paladan, 2018). Research papers that compare different ad formats (e.g., image vs. video, carousel vs. single image ads) are more common in sectors like retail or consumer goods; nonetheless, such detailed studies are not as frequent in the higher education context (Wei, Yang, Shoenberger, & Shen, 2021 Hunt, Lin, & Atkin, 2014). There have been several studies on the ROI of digital marketing in education, but fewer focus on ROAS and the use of Instagram specifically for universities (Qin & Pauwels, 2023; A. E. C. Team, 2022). Most universities rely on student feedback and engagement analytics rather than financial returns as the main performance indicator.

Social Networks and Instagram in Digital Marketing for HEIs

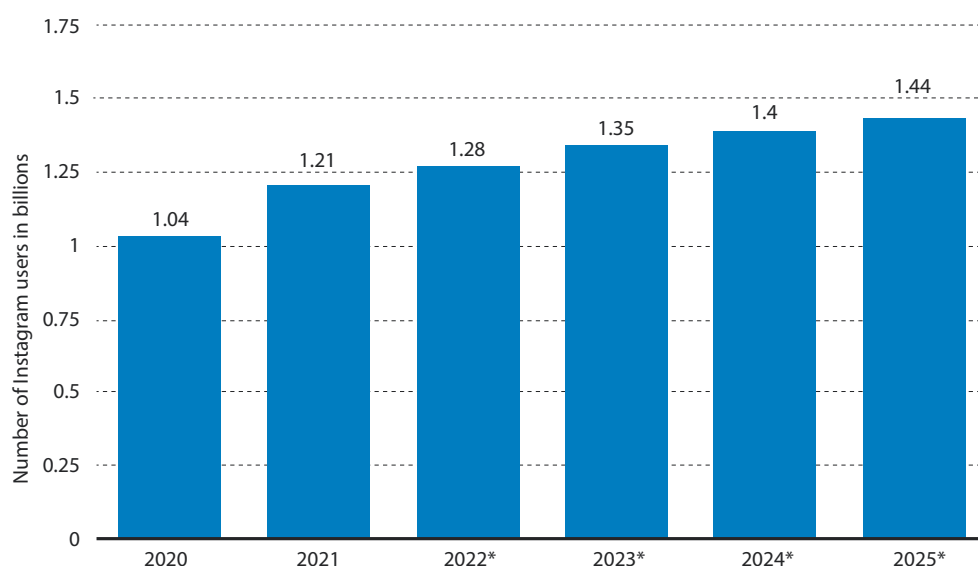
Digital marketing in higher education institutions (HEIs) is rapidly growing, (Nikolić, 2023) with universities using social media sites and platforms like Instagram to engage with potential students and build brand awareness. Social media marketing is particularly effective in reaching younger audiences, highly active on platforms like Instagram. It is identified as a powerful tool in promoting educational services, especially in the competitive landscape of student recruitment. It allows institutions to establish their reputation, increase trust, and attract more prospective students by leveraging interactive media platforms (ŞIŞCAN, 2022) (Mishina & Pace, 2021). The rise of social media and online platforms has enabled universities to reach a wider audience and engage with students more personally (Barus, 2023).



Social media has fundamentally transformed communication and business practices, making it a critical component of modern marketing strategies (Shields, 2016). With the rapid advancement of internet technologies (Rejeb, Rejeb, Abdollahi, & Treiblmaier, 2022), social media has become deeply integrated into daily life, with an estimated 5.85 billion users projected by 2027 (Dixon, 2023). Social media platforms, defined as internet-based applications facilitating user interaction and content generation (Carr & Hayes, 2015), have created new opportunities for businesses and institutions (Kaplan & Haenlein, 2010). They are crucial for promoting advertising campaigns and communicating with current and prospective students, and they are the most important channels for strengthening the competitive advantage of HEIs (Salem, 2020). Effective use of social media can enhance brand awareness and trust among students (Lisun, 2023).

Instagram, launched in 2010, has emerged as a leading platform in the social media landscape experiencing rapid user growth, particularly for visual content sharing (Hu, Manikonda, & Kambhampati, 2014). Instagram's success lies in its ability to facilitate creative visual storytelling through photos, images, and short videos with creative design (Hunt, Lin, & Atkin, 2014), making it an attractive platform for marketing, especially in sectors like higher education that rely on engaging and persuasive content to attract prospective students. According to Statista, its rapid user growth underscores its importance, with over 1.21 billion users globally in 2021, representing a growth of approximately 16.34% compared to the previous year, and this percentage continues to rise, reaching 29.8% in 2023, with predictions of 38.46% for the year 2025 (Dixon, 2023). According to the projections shown in Figure 1, "In 2021, there were 1.21 billion monthly active Instagram users, accounting for over 28% of global internet users. By 2025, it is predicted that there will be 1.44 billion monthly active users on the social media platform, constituting 31.2% of global internet users". (Dixon, Instagram: number of global users 2020-2025, 2023). The platform's ability to reach a vast and engaged audience has made it a strategic tool for organizations aiming to enhance competitiveness and survival in the digital age (Lin, Luo, Benitez, Luo, & Popović, 2021). Paid advertising on Instagram encompasses various theories and concepts that aid in understanding the effective utilization of this platform for marketing purposes (Aydinlioglu, 2019). Instagram's advertising features, grounded in theories of visual storytelling, user engagement, influence, conversions, and ethics, offer institutions a powerful means of reaching and influencing target audiences.

Figure 1. Number of Instagram users worldwide from 2020 to 2025

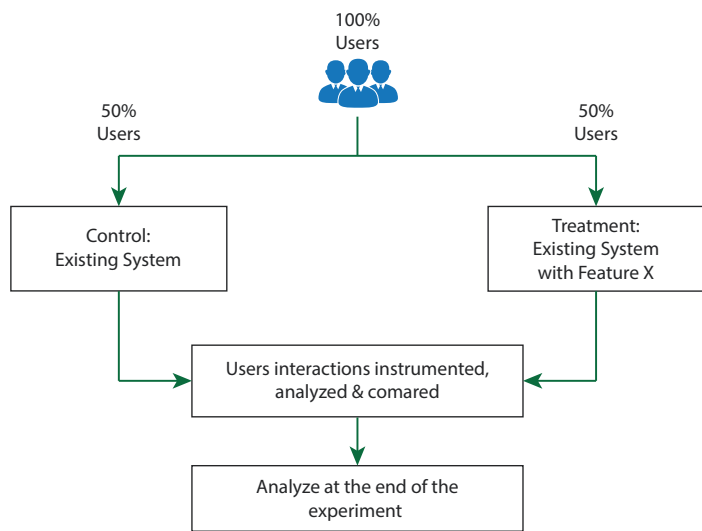




A/B Testing in Digital Marketing

The simplest experimental setup is to evaluate a factor with two levels, a control (version A) and a treatment (version B). The control is normally the default version and the treatment is the change that is tested. Such a setup is commonly called an A/B test (Kohavi & Longbotham, 2017), as shown in Figure 2. Essentially, A/B testing involves comparing two or more campaign variations to determine which performs better against predefined metrics. It has become a foundation of data-driven digital marketing, providing a methodological approach to optimizing campaign performance (Faisal, Naseer, & Akram, 2023).

Figure 2. High-level structure of an online experiment



This approach is particularly valuable in digital marketing, where subtle changes in campaign design can significantly impact outcomes. The process of A/B testing includes setting clear objectives, identifying variables to test, segmenting the audience, and analyzing the results to make informed decisions (Singh, Nanavati, Kar, & Gupta, 2022). In the context of HEI's marketing, A/B testing allows institutions to refine their digital strategies, ensuring that limited resources are used effectively to maximize reach and engagement. For Serbian higher education institutions, where marketing budgets are often constrained, A/B testing provides a critical tool for determining the most cost-effective advertising strategies.

Cost-Effectiveness and Return on Ad Spend (ROAS) in HEI's Marketing

The concept of cost-effectiveness in digital marketing is closely tied to the measurement of return on ad spend (ROAS), which assesses the revenue generated from marketing campaigns relative to the amount spent on those campaigns. In higher education institutions (HEIs), where budgetary constraints are a key consideration, optimizing ROAS becomes essential for ensuring that marketing investments lead to tangible enrollment outcomes. The theoretical framework for assessing cost-effectiveness includes various metrics and measurement tools that help institutions identify the most efficient marketing strategies. These include short-term and long-term effects, audience segmentation, and competition analysis (Revillard, 2022). By analyzing these factors, higher education institutions can develop marketing strategies that attract prospective students and ensure sustainable growth and competitiveness in a crowded market.



Unlike ROI, which accounts for total revenue relative to total costs, ROAS specifically measures the efficiency of advertising spend. This makes it a more targeted metric for digital marketing campaigns, as it directly relates to the advertising expenditure used to attract prospective students. ROAS allows HEIs to evaluate the performance of individual ad formats, such as image versus video content, and make data-driven decisions to allocate resources more effectively.

In Serbia, where resources are particularly limited, optimizing ROAS through careful analysis and strategic planning is essential for the success of digital marketing campaigns (A. E. C. Team, 2022).

METHODOLOGY

This methodology is designed to provide a rigorous, data-driven analysis of the cost-effectiveness of Instagram marketing campaigns for higher education institutions in Serbia. By selecting target groups, comparing creative formats, and using A/B testing to gather quantitative data, the study aims to offer valuable insights that can guide future marketing strategies in the higher education institution sector.

Research Design

This study uses a quantitative research design to analyze the cost-effectiveness of Instagram marketing campaigns for higher education institutions in Serbia. The primary data collection method is A/B testing, conducted through the Facebook Ad Manager platform. This approach allows for a controlled comparison between two distinct creative formats, carousel posts, and video ads, targeted at the same audience segments.

Creative Approaches and Types of Advertising Format

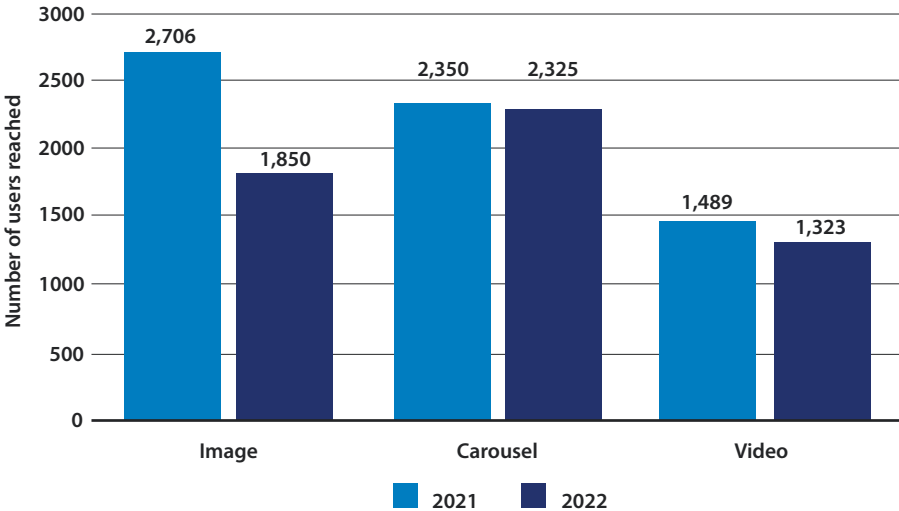
In this research, the comparison between carousel (IMAGE) ads and video (ANIMATED) ads focuses on the creative consistency and interaction dynamics between the two formats. The primary creative approach remains the same for both ad formats: both campaigns used the same message, visual elements, and overall theme, ensuring that the only variable in this comparison was the format type. The key creative difference between the ad formats lies in how content is presented. Carousel (IMAGE) ads feature static images that users can swipe through, providing them with more active control over the interaction. In contrast, video (ANIMATED) ads offer a dynamic experience with audio narration and a time-bound sequence, leading to a more passive, linear interaction. The carousel ads focus on visual engagement and user choice, while the video ads create a more immersive, synchronized experience with audio.

The main creative distinction between the two ad formats lies in the level of control users have over their interaction with the ad. The carousel ads, with their active control and swiping interaction, likely led to higher user engagement, as users were able to choose how to engage with the content and how much time they needed to consume the content. The video ads, while providing an emotional, immersive experience through audio-visual synchronization, offered less control, which could result in lower interaction rates. The carousel format may also have benefited from being simpler and more visually curated, contributing to better cost-effectiveness (e.g., lower CPC, CPLPV, CPR) compared to the video format, which offered a more immersive but less interactive experience.



Through an analysis of the advantages and disadvantages of each format, a decision has been made to compare two distinct advertising formats with the same creative approaches, carousel posts, and video ads, to determine which format is more effective in achieving the campaign's objectives. According to a study by *Metricool* (Romero, 2022), the average user reach per image post on Instagram in 2022 was 1,850 users, which is a decrease from 2,706 in 2021. Overall, the average user reach per carousel post has slightly declined to 2,325 users in 2022, while the average user reach per video post on social media remains at the bottom of the list shown in Figure 3 (Dixon, 2023).

Figure 3. Instagram: average reach per post type 2022



The main reason we decided to compare these two formats is their interaction with end users. Liu and Shrum identified three dimensions of interactivity: active control, two-way communication, and synchronicity (Liu & Shrum, 2002).

As Wei has shown in their study “Interacting with Social Media Ads: Effects of Carousel Advertising and Message Type on Health Outcomes”, carousel ads allow users to swipe through multiple images or videos within a single ad. This format is chosen for its ability to present a series of related messages, thereby engaging users in a narrative or detailed exploration of the institution’s offerings (Wei, Yangb, Shoenberger, & Shen, 2021). Carousel posts are particularly suited for campaigns that aim to convey complex information or showcase multiple aspects of a university. Also, this format has significant potential to enhance user engagement and interactivity, which may, in turn, contribute to greater advertising effectiveness (Wei, Yang, Shoenberger, & Shen, 2021).

Video ads offer dynamic content that combines visuals, audio, and narrative to capture attention quickly (Bakhtiary & Behzadi, 2023). This type of ad is perceived as more intrusive than the display one (Riyanto, Rachmadian, Putra, & Ananda, 2023). Also, this format is selected for its potential to create an emotional connection with the audience and its effectiveness in driving engagement (Ozuem, Ranfagni, & Willis, 2024). Short video social media advertising effectiveness is influenced by consumer engagement and purchase intention, but more research is needed on the features and impact of these ads on consumer behavior (Yueqin & Teo, 2023). However, video ads are more resource-intensive to produce and, according to *Confect* (*Meta Business Partner*), have a 24% higher cost-per-purchase and 7% lower click-through rate than image ads (Confect, 2023), which is an important consideration in the context of budget constraints.



A/B Testing Framework

A/B testing has been selected as the fundamental methodology due to its capability to deliver precise, real-time insights into the performance of diverse ad formats within comparable conditions (Quin, Weyns, Galster, & Costa Silva, 2024). The study's design adheres to the following key principles:

- **Consistency of Creative Concepts.** The A/B tests compare campaigns that use either identical or closely related creative concepts, with the only variable being the ad format (carousel posts vs. video ads). This ensures that any observed differences in performance can be attributed to the format itself rather than other creative elements.
- **Target Audience.** The campaigns are directed towards specific demographic groups, ensuring that the same audience segments are exposed to both types of ads. This includes users aged 13-34 from Serbia, segmented into three groups: Group I (13-17 years), Group II (18-24 years), and Group III (25-34 years). Group II, representing potential undergraduate students, is the primary focus due to its relevance to higher education marketing.
- **Timeframe and Budget.** Each A/B test had a timeframe of 31 days to gather meaningful data, depending on the campaign's reach and engagement rates. Budget constraints are managed to ensure that both formats receive an equivalent share of the total advertising spend, thereby allowing for a fair comparison.
- **Performance Metrics.** The study tracks a range of performance metrics, including Cost per click (CPC), Cost per landing page view (CPLPV), Cost per registration (CPR), and engagement rates. These metrics are critical for evaluating the cost-effectiveness of each ad format.

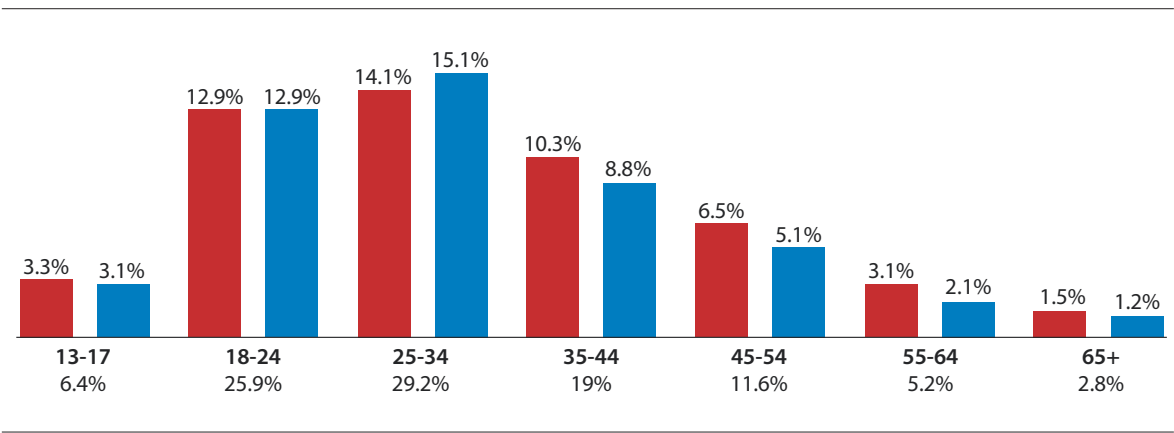
Target Groups

When defining the target audience, various factors were considered, including demographic and geographic aspects. Marketers are increasingly combining several variables to identify smaller, better-defined target groups (Kotler & Keller, 2021). The selection of target groups is based on demographic data relevant to higher education marketing – primarily involving age, gender, location, and the possibility of segmenting the target audience into smaller groups with similar characteristics. The target audience included both genders in three different age categories from the territory of Serbia, specifically Group I (13-17), Group II (18-24), and Group III (25-34).

The focus was on Group II since it represents the largest demographic group interested in enrolling in undergraduate academic studies. Additionally, according to data from *NapoleonCat*, illustrated in the graph shown in Figure 4 (NapoleonCat.com, 2022), most Instagram platform users fall within this age group, making it one of the most valuable platforms for implementing paid marketing campaigns on social media.

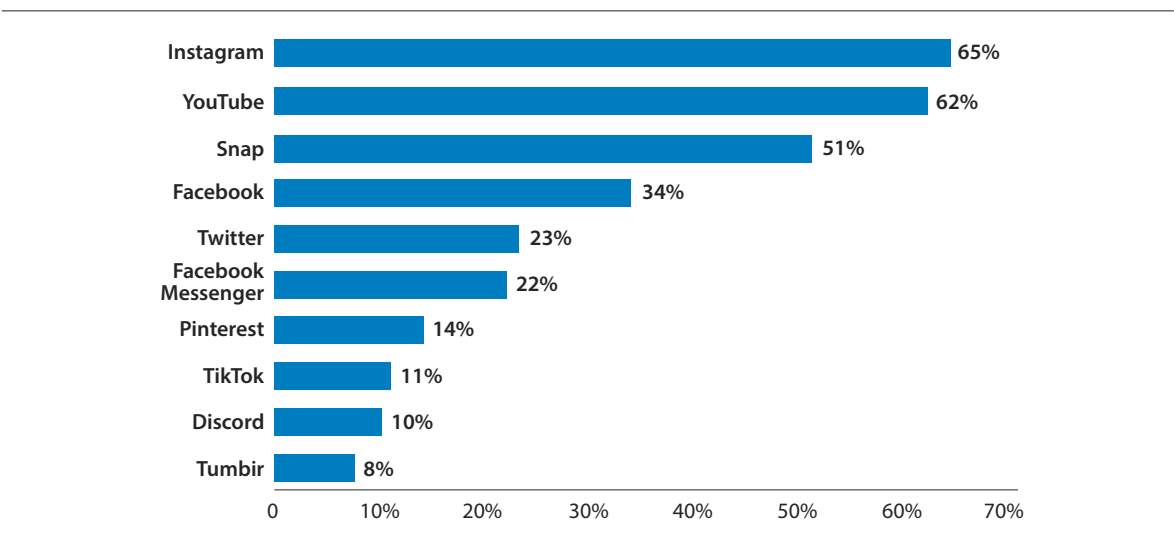


Figure 4. Distribution of Instagram users in Serbia as of July 2022, by age and gender



According to studies conducted by the *Pew Research Center*, the first two groups can be categorized as Generation Z (1997-2012), while the third can be categorized as Generation Y (1981-1996), also known as Millennials (Dimock, 2019). The primary target group, Generation Z, represents the majority of prospective students, making them a critical demographic for higher education marketing. According to a survey conducted by Business Insider shown in Figure 3, Instagram is still the most dominant Social Networking Service (SNS) platform among teenagers, with 64.59% of Gen Z saying they check the app daily (Green, 2019). The second most used platform is YouTube with 62%, followed by Snapchat with 51%, Facebook with 34%, and X (formerly known as Twitter) with 23%, among others (Gal, 2019).

Figure 5. The most popular social media platforms used by Generation Z



The research is geographically focused on Serbia, which presents unique challenges and opportunities for digital marketing due to its limited budgets and specific cultural context. This focus enhances the study's relevance to the local higher education market.



Data Collection and Analysis

The data for this study was acquired using the Facebook Ad Manager platform, which provides detailed analytics on ad performance. The platform's built-in A/B testing tools are used to set up and monitor the campaigns, ensuring that the data is accurate and relevant to the research objectives. Metrics such as CPC, CPLPV, and CPR are automatically tracked by Facebook Ad Manager.

The analysis involves comparing the performance of carousel posts and video ads across the various metrics. Facebook Ad Manager primarily uses statistical methods like chi-squared tests and t-tests to analyze the performance of A/B tests (Quin, Weyns, Galster, & Costa Silva, A/B testing: A systematic literature review, 2024), and to determine the significance of any differences observed between the two formats. The analysis focuses on identifying which format offers better cost-effectiveness and engagement. The study also conducts a subgroup analysis to explore how different audience segments (e.g., age, and gender) respond to each format. This analysis provides deeper insights into the effectiveness of the ads for specific target groups.

Ethical Considerations

The study adheres to ethical standards in digital marketing research. Consent for data collection is obtained through the Facebook platform's user agreements (Facebook, 2024), and no personally identifiable information is used in the analysis. The study also ensures that all advertising content is designed to be non-deceptive and respectful of the audience's autonomy.

RESULTS AND DISCUSSION

This research addresses a gap in the existing literature by applying a more rigorous, data-driven approach (A/B testing and ROAS) to a field that typically emphasizes qualitative outcomes. It brings a new perspective on measuring the direct financial return of social media campaigns in higher education, moving beyond the usual engagement metrics.

The main hypothesis was formulated based on expectations from previous campaigns. It started with the assumption that “Carousel ads are more cost-efficient and generate higher engagement rates than video ads in Instagram advertising campaigns for higher education institutions.”

So, research focused on the question “Which ad format achieves a higher engagement rate by effectively prompting user interactions relative to reach and impressions?” and “Which ad format demonstrates superior ROAS in higher education contexts?”

When analyzing the results of the tested marketing campaigns, it is crucial to emphasize that specific factors were considered to assess campaign effectiveness. A comparative analysis of metrics was conducted, including Cost per link click, Landing page view, conversions (in our case, CPR - Cost per registration), and overall return on ad spend (ROAS). These evaluations aim to make a comprehensive decision about which campaign yields the best results in achieving the marketing goals of higher education institutions in Serbia.



Table 1. Results of A/B tested marketing campaigns

CAMPAIGN NAME	VIDEO	IMAGE
Reporting starts	18th March	18th March
Reporting ends	19th April	19th April
Impressions	1,421,677	1,380,512
Reach	231,070	220,714
Frequency	6.152	6.254
Link clicks	692	1827
CPC - Cost per link click (EUR)	1.896	0.717
Unique link clicks	663	1701
Landing page views	325	838
CPLPV - Cost per landing page view (EUR)	4.038	1.564
Website registrations completed	108	138
Amount spent (EUR)	1,312.43	1,311.17
Results (Registration)	108	142
CPR - Cost per Registration (EUR)	12.152	9.233

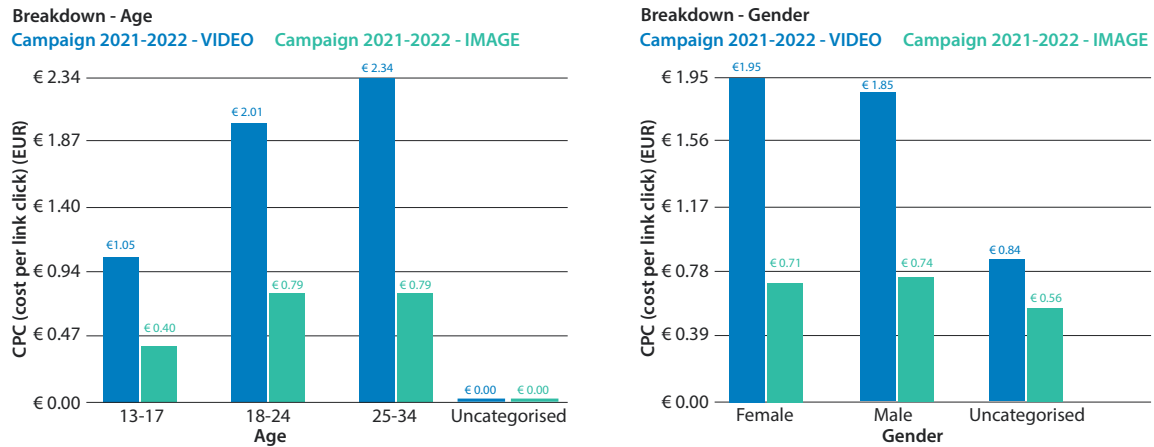
The presentation and interpretation of CPC (Cost per link click) results are crucial for evaluating the effectiveness of campaigns (Alkarablieh & Khraim, 2015). The analysis of these results reveals a significant cost difference between VIDEO and IMAGE campaigns, providing key insights into the effectiveness of different advertising formats with the same creative approaches. In this case, the cost for the VIDEO campaign was 164.93% higher compared to the IMAGE campaign. This data leads us to the conclusion that the IMAGE campaign is more cost-effective in terms of CPC compared to the VIDEO campaign, i.e., each click on the IMAGE campaign costs 0.38 times less than a click on the VIDEO campaign. This indicates that the IMAGE campaign is more cost-effective in attracting visitors or potential students.

Table 2. The results of CPR in Instagram Marketing Campaign Using A/B Testing

Campaign	CPC - Cost Per link Click	Link Clicks	Reach	Impressions	Amount Spent
VIDEO	€1.90	683	221K	1.40M	€1,295.41
IMAGE	€0.73	1.786	210K	1.36M	€1,293.69



Figure 6. Instagram: Cost Per Link Click (CPC) by age & gender



The creative approaches were carefully designed to equally provide the interests of all genders, as the cost per click (CPC) results are balanced between genders. Additionally, there is a noticeable and significant difference in CPC between the IMAGE and VIDEO campaigns.

Analyzing the data across three different age categories and their relation to cost per click, we can conclude that Category I (ages 13-17) performed the best in the IMAGE campaign. This group achieved nearly 97.5% better results compared to Categories II (ages 18-24) and III (ages 25-34) using the same creative content. This suggests that the IMAGE campaign's creative approach is more appealing to a younger audience, making it particularly effective in attracting visitors or potential students from this age group.

CPLPV - Cost per Landing Page View

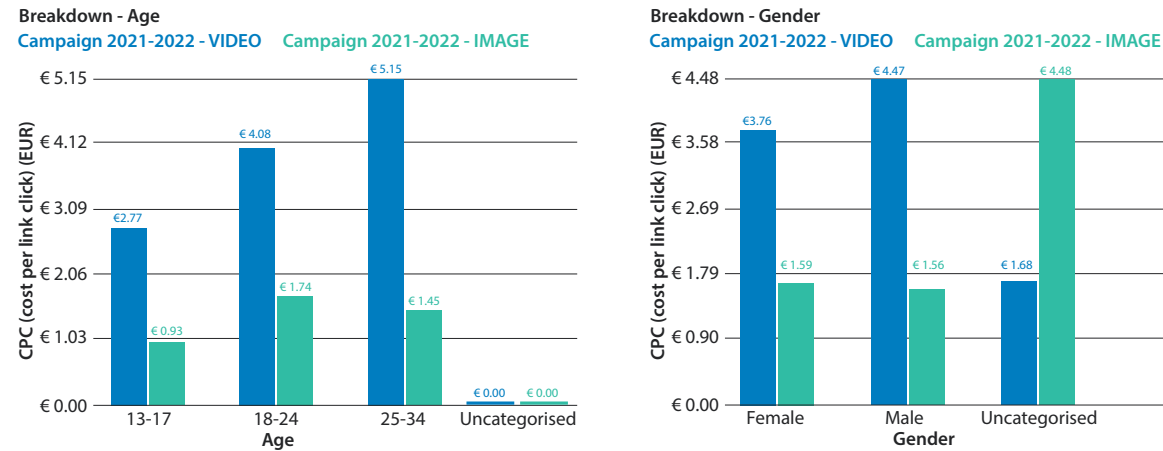
The analysis of Cost per landing page view reveals that the IMAGE campaign had a lower CPLPV compared to the VIDEO campaign, indicating the cost-effectiveness of the IMAGE campaign in attracting visitors to the landing page at a lower cost per view. In this case, that is crucial for increasing visitor engagement on the admission page. The CPLPV showed a significant percentage difference between the prices of the VIDEO and IMAGE campaigns, amounting to as much as 155.7%.

Table 3. The results of CPLPV in Instagram Marketing Campaign Using A/B Testing

Campaign	CPLPV - Cost per Landing Page View	Link Clicks	Reach	Impressions	Amount Spent
VIDEO	€4.04	321	221K	1.40M	€1,295.41
IMAGE	€1.58	821	210K	1.36M	€1,293.69



Figure 7. Instagram: Cost per Landing Page View (CPLPV) by age & gender



The data indicates that each landing page view resulting from the VIDEO campaign is 2.56 times more costly compared to the IMAGE campaign. It also highlights the IMAGE campaign's higher cost-effectiveness in terms of CPLPV, demonstrating that achieving similar results in landing page views is possible at lower costs. This information is essential for making marketing strategy decisions, particularly when considering budget limitations and campaign objectives.

CPR - Cost per Registration

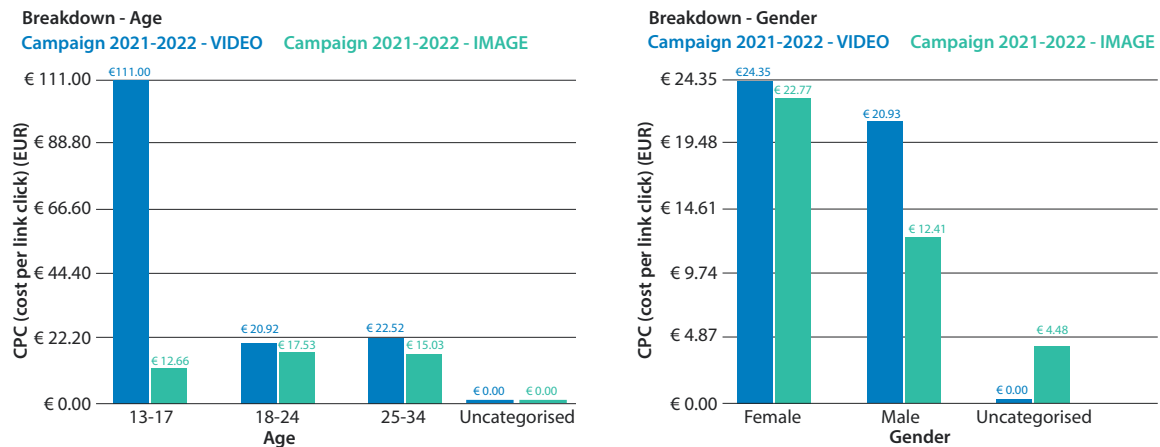
The results of Cost per Registration (CPR) are crucial for evaluating the success of marketing campaigns. In this case, the cost of the VIDEO campaign is 31.55% higher compared to the IMAGE campaign. The difference in registration costs indicates the success of the IMAGE campaign in attracting potential students and converting them into registrations with lower expenses. This information is essential for evaluating the cost-effectiveness of campaigns, especially when considering marketing goals and budgetary factors.

Table 4. The results of CPR in Instagram Marketing Campaign Using A/B Testing

Campaign	CPR - Cost per Registration	Link Clicks	Reach	Impressions	Amount Spent
VIDEO	€22.73	57	221K	1.40M	€1,295.41
IMAGE	€16.59	78	210K	1.36M	€1,293.69



Figure 8. Instagram: Cost per Registration (CPR) by age & gender.



Similarly, it can be concluded that male users were more likely to choose online registration through the IMAGE campaign. Analyzing registration data across three different age categories, it is observed that all three categories are evenly represented. An exception is the Cost per registration (CPR) for Category I (13-17 years) within the VIDEO campaign, where the cost of the VIDEO campaign is higher by 775.71% compared to the IMAGE campaign. This significant difference implies that either there is an anomaly or an extremely small number of users who registered on the site came through the VIDEO campaign.

Based on the analysis of these cost metrics, it can be concluded that the IMAGE campaign is more efficient and economical compared to the VIDEO campaign by 24.15% in terms of all three measured factors: CPC, CPLPV, and CPR. This means that considering the cost, the IMAGE campaign achieves the same or better results in attracting visitors, landing page views, and registrations of potential students with 24.15% lower costs compared to the VIDEO campaign. This data can serve as a basis for optimizing marketing strategies and resource allocation for higher education institutions to achieve better results with smaller budgets.

Engagement Rate

To determine which ad format achieves a higher engagement rate for Instagram campaigns in higher education, we focused on actions users take on ads relative to their reach, impressions, and link clicks. To analyze the overall engagement rate, we focused on metrics like CTR and conversion rate to understand initial engagement (clicks) and deeper engagement (registrations). This multi-faceted approach provides a better insight into cost-effectiveness and engagement in this campaign, helping to refine strategies for higher education institutions.

To measure the engagement rate based on Link Clicks, Impressions, and Reach, we calculated the Click-through rate (CTR) for each format relative to impressions and reach.



$$\text{CTR based on Impressions:} \quad \text{CTR by Impressions} = \frac{\text{Link Clicks}}{\text{Impressions}} \times 100 \quad (1)$$

$$\text{CTR based on Reach:} \quad \text{CTR by Reach} = \frac{\text{Link Clicks}}{\text{Reach}} \times 100 \quad (2)$$

Animated (VIDEO campaign) Ads

$$\text{CTR based on Impressions:} \quad \text{CTR by Impressions (Video)} = \frac{692}{1,421,677} \times 100 = 0.05\% \quad (3)$$

$$\text{CTR based on Reach:} \quad \text{CTR by Reach (Video)} = \frac{692}{231,070} \times 100 = 0.30\% \quad (4)$$

Carousel (IMAGE campaign) Ads

$$\text{CTR based on Impressions:} \quad \text{CTR by Impressions (Image)} = \frac{1827}{1,380,512} \times 100 = 0.13\% \quad (5)$$

$$\text{CTR based on Reach:} \quad \text{CTR by Reach (Image)} = \frac{1827}{220,714} \times 100 = 0.83\% \quad (6)$$

The carousel (IMAGE campaign) ad format achieves a significantly higher engagement rate, with 0.13% CTR by Impressions and 0.83% CTR by Reach, compared to 0.05% and 0.30% for animated (VIDEO campaign) ads. This indicates that the carousel ads are more effective at prompting user interactions (link clicks) relative to both reach and impressions in this campaign.

ROAS - Return on Ad Spend

To calculate the Return on Ad Spend (ROAS), we determined both campaigns' total revenues. With that information for both campaigns, we calculated the ROAS for the VIDEO and IMAGE campaigns using the following formulas:

$$\text{ROAS Video} = \frac{\text{Total Revenue from Video Campaign}}{\text{Advertising Cost for Video Campaign}} \quad \text{ROAS Video} = 125.06 \quad (7)$$

$$\text{ROAS Image} = \frac{\text{Total Revenue from Image Campaign}}{\text{Advertising Cost for Image Campaign}} \quad \text{ROAS Image} = 162.45 \quad (8)$$

These calculated ROAS values show how many times the revenue is greater than the cost of advertising for each campaign, which leads us to the conclusion that the IMAGE campaign achieves a higher ROAS compared to the VIDEO campaign, indicating better advertising efficiency and a higher Return on Ad Spend during the measured period.

We calculated the percentage difference between ROAS for VIDEO and IMAGE campaigns using the following formula:

$$\text{Percentage Difference} = \frac{\text{ROAS Image} - \text{ROAS Video}}{\text{ROAS Video}} \times 100 = 29,9\% \quad (9)$$



This means that the ROAS for the IMAGE campaign is about 29.9% higher compared to the VIDEO campaign over 31 days. The most important conclusion is that the IMAGE campaign achieved a significantly better ROAS in percentages compared to the VIDEO campaign. This difference in percentages indicates a better return on advertising spend and efficiency for the IMAGE campaign, which is crucial for achieving marketing goals with smaller budgets.

Limitations and Future Research

This study offers valuable insights into the cost-effectiveness and engagement of carousel (IMAGE) and video (ANIMATED) ads in Instagram campaigns for higher education. However, several limitations should be noted. The sample size, while appropriate, could be expanded to improve result accuracy and generalizability. Additionally, the 31-day timeframe limited the ability to capture seasonal variations or long-term trends, suggesting that a longer study period would provide more robust conclusions.

The research focused on two ad formats on a single platform, Instagram. Future research could explore additional creative strategies (e.g., Instagram Stories, Reels) or other platforms (Facebook, TikTok, LinkedIn) to assess whether the trends observed here are consistent across different formats. Furthermore, the study primarily examined ad formats, demographics, and geographic factors, while other elements, such as ad content, creative approaches, and publication timing, were not explored in detail. Future studies should investigate how these factors impact engagement and conversion rates.

It is also essential to consider the evolving nature of social media algorithms and user preferences, which can significantly affect campaign outcomes. Longitudinal data would help assess the long-term impact of ad campaigns on student recruitment, enrollment, and retention. In conclusion, this research provides valuable insights, but further studies should address these limitations to optimize strategies for student recruitment in higher education.

CONCLUSION

The results of the study confirm the main hypothesis that carousel (IMAGE) ads are more cost-efficient and generate higher engagement rates than video (ANIMATED) ads in Instagram advertising campaigns for higher education institutions. Through an analytical approach incorporating cost-effectiveness metrics, including Return on Advertising Spend (ROAS), and an A/B testing framework, this research offers a clear model for campaign efficiency in higher education marketing.

In response to the question, "Which ad format achieves a higher engagement rate by effectively prompting user interactions relative to reach and impressions?", the carousel (IMAGE) ad format was shown to achieve a significantly higher engagement rate, with a 0.13% CTR by Impressions and a 0.83% CTR by Reach, outperforming the video (ANIMATED) campaign, which generated a 0.05% and 0.30% CTR, respectively. This difference underscores the carousel format's greater effectiveness in driving user interactions and reaching potential students. Compared to the average click-through rate (CTR) for the Education & Instruction industry, which stands at 0.53% for display ads (Datawrapper, 2024), we can conclude that the carousel ad format has performed significantly above the industry average, while the video ad format fell slightly below it.



Regarding "Which ad format demonstrates superior ROAS in higher education contexts?", findings indicate that the carousel ad format generated a superior return on advertising spend (ROAS). The IMAGE campaign demonstrated lower costs per click (CPC), per landing page view (CPLPV), and per registration (CPR) than the VIDEO campaign, highlighting its efficiency in attracting website visitors and prospective students at a reduced cost.

These findings are especially relevant as universities face increasing competition for student recruitment and aim to optimize their limited marketing budgets. By providing a cost-effective and high-engagement ad format, the research offers a practical, data-driven framework that institutions can replicate across other digital platforms or adapt with new ad formats. Moreover, the successful use of carousel ads to engage younger demographics (ages 13-17) suggests that this format is well-suited for reaching target age groups effectively.

Overall, this paper not only validates the benefits of carousel ads in Instagram campaigns for higher education but also serves as a valuable resource for institutions seeking to enhance recruitment efforts through targeted and cost-effective digital marketing strategies.

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VISOKO OBRAZOVANJE U ERI DIGITALNOG MARKETINGA: PROCENA ISPLATIVOSTI FORMATA OGLASA U INSTAGRAM KAMPANJAMA KORIŠĆENJEM A/B TESTIRANJA

Rezime:

U doba digitalnog marketinga, visokoškolske ustanove sve više koriste društvene medije, kao što je Instagram, kako bi poboljšale svoju vidljivost i privukle potencijalne studente. Ova studija ispituje isplativost Instagram marketinških kampanja visokoškolskih ustanova putem A/B testiranja, fokusirajući se na različite formate oglašavanja sa istim kreativnim pristupima. Upoređivanjem statičnih slika sa animiranim slikama (u obliku videa), istraživanje potvrđuje da su karusel oglasi isplativiji i da dovode do većeg stepena pažnje publike od video oglasa. Konkretno, oglasi u obliku karusela su postigli znatno veće stope učestalosti klikova (*CTR*) i po prikazima i po dosegu, znatno nadmašujući video oglase. Analiza pokazuje da su kampanje koje koriste format statične slike isplativije, pokazujući niže troškove po kliku (*CPC*), cenu po prikazu određene stranice (*CPLPV*) i cenu po registraciji (*CPR*). Štaviše, studija naglašava da karusel postovi značajno nadmašuju video oglase u smislu povraćaja troškova oglašavanja (*ROAS*), pri čemu karusel kampanje ostvaruju približno 29,9% bolji učinak. Štaviše, studija naglašava da karusel postovi značajno nadmašuju video oglase u pogledu povraćaja troškova oglašavanja (*ROAS*), pri čemu karusel kampanje ostvaruju približno 29,9% bolji učinak. Rezultati naglašavaju važnost ciljanja publike, uz napomenu da različite starosne grupe i polovi različito reaguju na marketinške akcije. Uprkos određenim ograničenjima, kao što su veličina uzorka i vremenski okvir, rezultati potvrđuju zaključke studije i naglašavaju efikasnost karusel postova u jačanju imidža i angažovanja institucije. Ova studija nudi važne uvide i perspektive za unapređenje i optimizaciju Instagram marketinških strategija u visokom obrazovanju, koje mogu doprineti povećanju upisa i vidljivosti institucija.

Ključne reči:

formati oglašavanja,
Karusel,
video,
društveni mediji,
ROAS.

JEL klasifikacija:

I12, M3, O3