



A Synthesis of research studies on public relations multimedia utilization within an educational institute during the COVID-19 pandemic: A comparative analysis of textual and data visualization approaches

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Abstract

This study constituted a comprehensive synthesis of research conducted in the domain of public relations multimedia within an educational institute during the unprecedented Covid-19 pandemic. The synthesis encompassed a meticulous examination of the research findings pertaining to the dimensions of content and media presentation, as well as the perception and satisfaction levels among the selected sampling groups concerning the employment of public relations multimedia. The investigation specifically focused on the case studies conducted at the Faculty of Industrial Education and Technology, King Mongkut's University of Technology Thonburi, throughout the Covid-19 pandemic. The research encompassed the past two academic years (2021–2022), and encompasses a total of ten nationally and internationally published studies. The synthesized findings provided compelling evidence of the adherence of these studies to the well-established ADDIE Model. Furthermore, a diverse range of multimedia formats were identified, including infographic posters, video motion graphic clips (accompanied by supplementary activities) in seven studies, video clips in two studies, and an electronic book in one study. Expert panel evaluations consistently indicated a high level of quality in terms of both content and media presentation. The perceptual and satisfaction assessments conducted among the sample group indicated exceptionally positive responses towards the utilization of multimedia in the public relations domain. Subsequent to the synthesis of textual data, the researchers employed the Tableau platform for data visualization, facilitating an enriched presentation of analytical insights.

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Introduction

In November 1, 2021, Thailand experienced a challenging Covid-19 situation. In South Asia, Thailand ranked third in terms of the highest number of Covid-19 patients, with a total of 1,920,189 cases, trailing behind India (34.2 million patients) and Indonesia (4.2 million patients). This implies an incidence rate of 2,751 patients per 100,000 people, in comparison to Maldives (16,240 patients per 100,000) and Nepal (2,790 patients per 100,000). The country also reported 19,260 fatalities, placing it fourth in South Asia after India, Indonesia, and Bangladesh. To address the escalating crisis, the Prime Minister of Thailand established a Center to Control the Spread of Covid-19 on March 12, 2021, as the situation gradually worsened. Consequently, on March 17, 2021, the government issued an order for the closure of all educational institutes, tutoring schools, and entertainment establishments, while also urging the public to cease religious activities, gatherings, and festive events. As a result, remote work became a necessity during this period (Thitichai & Taweewikayakarn, 2021).

King Mongkut's University of Technology Thonburi (KMUTT) was profoundly affected by these circumstances. On March 21, 2021, the Bangkok Metropolitan Administration Office issued an announcement to temporarily close the university campus as a preventive measure against Covid-19. Consequently, all staff members were required to work from home, and students were instructed to engage in online learning. Final-year students were permitted to conduct practical work and research in laboratories under careful supervision, as the situation improved gradually in 2021 and 2022, leading up to the most recent announcement, which was the 42nd release by the Bangkok Metropolitan Administration Office (Maneeewan, 2022). As a consequence, online learning and online research presentations became more prevalent, and the university had to adapt its public relations strategies to various online platforms.

Infographic was the practice of summarizing data or knowledge into information in the form of visuals (symbols, graphs, charts, diagrams, maps) to make it easier and quicker to understand. The purpose was to make the content more easily and quickly understandable to readers. It involved transforming a large amount of complex or intricate data into various graphical representations (static or dynamic) that are aesthetically appealing and capture the readers' attention. (Chansuwan, 2020). Motion graphics, on the other hand, involved the presentation of information through dynamic and creative visual elements. Particularly suited for the digital era,

motion graphics cater to individuals who preferred engaging with digital content and seek access to vast amounts of information within a limited timeframe (Saitong, 2017). Multimedia, as a concept, entailed the integration of diverse media formats to provide a comprehensive understanding of a subject from various perspectives. It encompassed various mediums, including print media, online platforms, and interactive activities, to facilitate effective communication and knowledge development (Malithong, 1997). In any organization, public relations played a crucial role. Publicity served as a means to disseminate information and news to the general public, fostering positive relationships and mutual understanding between the organization and its target audience, both internally and externally. For educational institutions, establishing trust and satisfaction with their educational systems became paramount, as it contributed to the organization's reputation and perceived reliability (Polchaniko, 2015).

Data visualization referred to the graphical representation of data through heat maps, charts, sparklines, infographics, or statistical graphs. By incorporating visual elements, data visualization simplifies comprehension and evaluation, enabling the extraction of valuable insights from the data. Consequently, relevant stakeholders could utilize these results to inform their decision-making processes. The effectiveness of data visualization was supported by technologies that offered features such as streaming data support, AI integration, embeddability, collaboration, interactive exploration, and self-service capabilities. Notable data visualization tools included Google Charts, Tableau, Grafana, Chartist, FusionCharts, Datawrapper, Infogram, and ChartBlocks (Simplilearn, 2023).

For the purpose of data synthesis in this study, the researchers utilized Tableau, a software that emerged from a computer science project at Stanford University. The project aimed to enhance data analysis workflows and improve data accessibility. Founded in 2003, Tableau's core technology, VizQL, was patented by its co-founders Chris Stolte, Pat Hanrahan, and Christian Chabot. VizQL facilitated visual data representation by transforming drag-and-drop operations into intuitive data queries through a user-friendly interface (Tableau, 2023). Given the program's user-friendly interface and effective data presentation capabilities, the researchers chose to employ Tableau for data synthesis and presentation.

Consequently, the researchers aimed to gather and synthesize research studies conducted on similar themes but utilizing different methodologies or conducted in different contexts. This synthesis sought to consolidate knowledge from diverse sources, thereby fostering

a more comprehensive and integrative understanding of the subject matter (Wiratchai, 2009). In some studies, this research approach was referred to as meta-analysis. The findings from this study were expected to contribute valuable insights for the future design and development of public relations multimedia tailored for Generation Z students within an educational institute.

Objectives

The objectives of this study were:

1. To synthesize research and development studies on public relations multimedia within an educational institute during the Covid-19 pandemic, utilizing both textual analysis and data visualization approaches.
2. To provide recommendations on how to develop public relations multimedia to enhance students' perception and satisfaction within an educational institute.

The Hypotheses

The hypotheses for this study were as follows:

1. The quality of the public relations multimedia for an educational institute during the COVID-19 pandemic was at a good level.
2. The sample group exhibited high perception and high satisfaction towards the developed public relations multimedia.

Expected Outcomes

The expected outcome of this research was to provide a comprehensive guideline for the development of public relations multimedia within an educational institute. This guideline would serve as a valuable resource for educational institutions to enhance their communication strategies and effectively utilized multimedia tools to promote their public relations efforts.

Methodology

This research used the method of content analysis, a quantitative research technique that uses statistical methods to analyze research work on various topics studied with the same problem, in order to derive systematic conclusions for accurate, in-depth, and credible research results. It was, therefore, a particularly important approach for obtaining knowledge that could be applied to high-quality practical operations. (Thanakwang, 2013) The methodology employed in this study was as follows.

Research Scope

The scope of this research encompassed the gathering and synthesis of ten research and development studies focused on public relations multimedia within the Faculty of Industrial Education and Technology at King Mongkut's University of Technology Thonburi (KMUTT) during the Covid-19 pandemic. These studies specifically targeted Generation Z students who were people born between 1997 and 2012 or those aged between 11 and 26 years (as of 2023). People in Generation Z grew up in an era where technology and digital communication played a significant role and these research studies were conducted over the past two academic years (2021–2022). The studies were published in national and international outlets. Each research study employed a sampling group consisting of Generation Z students, with approximately 30 participants in each group. The ten research studies included in this research were as follows:

1. The Development of Content Set and Activity for Public Relations Focusing on Participation in the Video Clip Contest Project Titled “The Scholarship for Children, Funding for the Future” (Kongsuwan et al., 2021).
2. The Development of Electronic Book Combined with QR Code Technology and Poster Set Exhibition of EESH Center Titled “How to Be KMUTT Green Nudges in 40 Steps” (Princhankol et al., 2021).
3. The Outcome from the Development of Multimedia and Special Events for Public Relations through Cooperative Learning to Promote the Funding Campaign for Faculty of Industrial Education and Technology Students with Financial Hardship (Princhankol & Thamwipat, 2021).
4. The Development of Viral Video for Public Relations of Master of Science in Industrial Education Program in Learning Technology and Mass Communication (Princhankol et al., 2021).
5. The Development of Public Relations Media Sets on Social Media Titled “Heliconia House KMUTT Hotel and Serviced Apartment” (Thamwipat et al., 2022).
6. The Development of Video Content Media for Public Relations, King Mongkut's University of Technology Thonburi Book Store (Thamwipat et al., 2022).
7. The Development of Visual Content Album to Promote the Image of FIET Ambassador (Jittawornmanee et al., 2022).
8. The Design and Development of Interactive Multimedia Based on ADDIE Model to Publicize the Department of Educational Communications and Technology (Thamwipat & Princhankol, 2022).

9. The Design and Development of Digital Contents on Social Media Network with Mega Influencers for Crowdfunding to Support Students with Financial Hardship (Princhankol & Thamwipat, 2022).

10. The Design and Development of Interactive Multimedia and Activities for New Normal Public Relations to Promote the Public Image of the Continuing Education Center (Namaso et al., 2022).

The researchers delineated the scope of this study by prioritizing the following topics from the 10 research studies:

1. Summary of the process: The researchers aimed to provide a comprehensive overview of the research process employed in the development of public relations multimedia within an educational institute during the Covid-19 pandemic.

2. Summary of the design and development of public relations multimedia: The focus was on summarizing the key aspects and methodologies utilized in the design and development of public relations multimedia, including the incorporation of various media formats and strategies.

3. Summary of research studies in terms of quality, perception, and satisfaction: The researchers sought to evaluate the quality of the research studies based on expert panel assessments. Additionally, they aimed to summarize the perception and satisfaction levels of the sample group, consisting of Generation Z students or students from KMUTT, towards the public relations multimedia initiatives.

4. Data visualization with Tableau presentation: The researchers utilized Tableau, a data visualization tool, for presenting the synthesized data. The emphasis was on visualizing the findings and insights derived from the research studies using Tableau's features and capabilities. By prioritizing these specific topics, the researchers aimed to provide a comprehensive and focused analysis of the research studies, their design and development,

quality assessment, perception, satisfaction, and the utilization of data visualization through Tableau.

Data Analysis

In this study, data analysis was conducted using statistical methods, specifically mean scores and standard deviation. The interpretation of the data was based on predefined criteria adapted from Krupee (2009). The criteria for interpretation were as follows:

Mean score between 4.51 and 5.00: Indicated a very good or the highest level.

Mean score between 3.51 and 4.50: Indicated a good or high level.

Mean score between 2.51 and 3.50: Indicated a moderate level.

Mean score between 1.51 and 2.50: Indicated a low level.

Mean score between 1.00 and 1.50: Indicated the lowest level.

These criteria were utilized to assess and interpret the data obtained in the study, providing insights into the quality, perception, and satisfaction levels of the sample group towards the public relations multimedia initiatives.

Results

1. Summary of the Process

The synthesis of 10 research studies revealed that the development of public relations multimedia followed the ADDIE Model, which consisted of five phases, as summarized in Table 1.

Based on the findings, it could be concluded that the research and development of public relations multimedia, which adhered to the five steps of the ADDIE Model, demonstrated high quality and could serve as a valuable resource for future endeavors in this field.

Table 1 Phases of the ADDIE Model

Phase	Details
Phase 1: Analysis	This phase involved analyzing the problems and demands related to public relations multimedia within the organization.
Phase 2: Design	The design phase focused on defining the scope of contents, selecting graphic images, and determining the types of formats through the use of storyboards.
Phase 3: Development	Multimedia components were developed using software such as Adobe Illustrator for graphics and Adobe After Effects for motion graphics. The quality of the contents and media presentation of the public relations multimedia was evaluated by a panel of three experts.
Phase 4: Implementation	The public relations multimedia were disseminated through various online platforms, including Facebook pages and websites. Additionally, in some cases, activities were conducted via the Zoom Meeting app.
Phase 5: Evaluation	The perception and satisfaction of the sample group were evaluated, and the collected data were subjected to statistical analysis prior to the research presentation.

2. Summary of the Design and Development of Public Relations Multimedia

The research studies presented various examples of public relations multimedia developed within the educational institute. Sample contents from the research studies are visually depicted in Figure 1 to Figure 10.



Figure 1 Motion graphics and activity



Figure 2 Samples of electronic a book



Figure 3 Multimedia and special events



Figure 4 Viral video for public relations



Figure 5 Posters and promotional videos



Figure 6 Promotional video clips



Figure 7 Visual content albums



Figure 2. The interactive multimedia entitled "Undergraduate Studies"



Figure 3. The interactive multimedia entitled "Graduate Studies"



Figure 4. The interactive e-book entitled "Employability Statistics of Graduates"

Figure 8 Images from promotional multimedia



Figure 1. The digital contents with mega influencers in the formats of posters, video

Figure 9 Posters and videos



Figure 2. shows the developed interactive multimedia and activities



Figure 3. shows motion graphic with QR code technology to interact with the audience



Figure 4. shows the activities for new normal public relations via Zoom Meeting

Figure 10 Multimedia and online activities

Table 2 shows that the findings regarding the design and development of public relations multimedia over the past two years indicated the presence of various types of multimedia. Specifically, among the analyzed research studies, infographic posters and video motion graphic clips (accompanied by special activities) were identified in 70 percent of the studies (7 out of 10). Additionally, video clips were observed in 20 percent of the studies (2 out of 10), while electronic books were found in 10 percent of the studies (1 out of 10).

Table 2 Types of Public Relations Multimedia

No.	Types	Analysis	Percentage
1	Infographic posters, video motion graphic clips	7	70
2	Video clips	2	20
3	Electronic book	1	10
Total Score		10	100

3. Summary of Research Studies

The quality of content and media presentation in the research studies was evaluated by expert panels. Each research study consisted of 3 experts who evaluated content quality and 3 experts who evaluated media presentation quality. Table 3 provides an overview of the evaluation results.

The evaluation results in Table 3 demonstrate the quality of content and media presentation for each research study. The mean scores represent the evaluation of content quality and media presentation, with corresponding Standard Deviations (*SD*) indicating the level of agreement among the evaluators. The research studies received high mean scores for both content quality and media presentation, ranking from 4.33 to 4.81. The average scores for content quality and media presentation across all studies were 4.43 and 4.77, respectively.

Based on the findings presented in Table 4, the perception of the sample group regarding the public relations multimedia developed for the Faculty of Industrial Education and Technology, KMUTT during the Covid pandemic for Generation Z students was rated at the highest level (Mean Score = 4.79, *SD* = 0.45). Furthermore, the satisfaction level of the sample group also ranked at the highest level (Mean Score = 4.77, *SD* = 0.43), confirming the research hypothesis.

Table 3 Evaluation of content quality and media presentation

No.	Research Study	Quality of Content	Quality of Media
		Mean Score (SD)/Ranking	Mean Score (SD)/Ranking
1	“The Scholarship for Children, Funding for the Future”	4.75 (0.44)/3	4.63 (0.49)/5
2	“How to Be KMUTT Green Nudges in 40 Steps”	4.67 (0.38)/6	4.52 (0.54)/7
3	“Promote the Funding Campaign for Faculty”	4.77 (0.02)/2	4.77 (0.05)/1
4	“Public Relations of Master of Science”	4.72 (0.46)/4	4.77 (0.42)/2
5	“Heliconia House KMUTT Hotel and Serviced Apartment”	4.36 (0.42)/9	4.49 (0.35)/9
6	“Public Relations Book Store”	4.57 (0.28)/8	4.53 (0.22)/6
7	“Image of FIET Ambassador”	4.33 (0.51)/10	4.71 (0.38)/3
8	“Publicize the Department”	4.69 (0.55)/5	4.43(0.46)/10
9	“Crowdfunding to Support Students”	4.67 (0.49)/7	4.66 (0.35)/4
10	“Continuing Education Center”	4.81 (0.24)/1	4.56 (0.43)/8
Total Average Score		4.63 (0.38)	4.60 (0.37)

Table 4 Perception and satisfaction of the sample group regarding public relations multimedia

No.	Research Study	Perception	Satisfaction
		Mean Score (SD)/Ranking	Mean Score (SD)/Ranking
1	“The Scholarship for Children, Funding for the Future”	4.70 (0.57)/4	4.58 (0.55)/7
2	“How to Be KMUTT Green Nudges in 40 Steps”	4.68 (0.51)/7	4.69 (0.47)/4
3	“Promote the Funding Campaign for Faculty”	4.79 (0.45)/1	4.76 (0.05)/2
4	“Public Relations of Master of Science”	4.77 (0.44)/2	4.77 (0.43)/1
5	“Heliconia House KMUTT Hotel and Serviced Apartment”	4.59 (0.73)/9	4.53 (0.72)/8
6	“Public Relations Book Store”	4.36 (0.21)/8	4.40(0.80)/10
7	“Image of FIET Ambassador”	4.68 (0.47)/5	4.52 (0.50)/9
8	“Publicize the Department”	4.74 (0.05)/3	4.66 (0.52)/5
9	“Crowdfunding to Support Students”	4.00 (0.59)/10	4.62 (0.55)/6
10	“Continuing Education Center”	4.68 (0.48)/6	4.76 (0.44)/3
Total Average Score		4.66 (0.45)	4.63 (0.50)

4. Data Visualization with Tableau Presentation

Following the text presentation, the researchers utilized the Excel program to input the data and subsequently employed Tableau to create concise and visually appealing summaries using a single image. The visual representation provided a comprehensive overview of the research findings.

Tableau Presentation:

F1: Public relations multimedia

F2: Amount of multimedia

F4: Quality of content

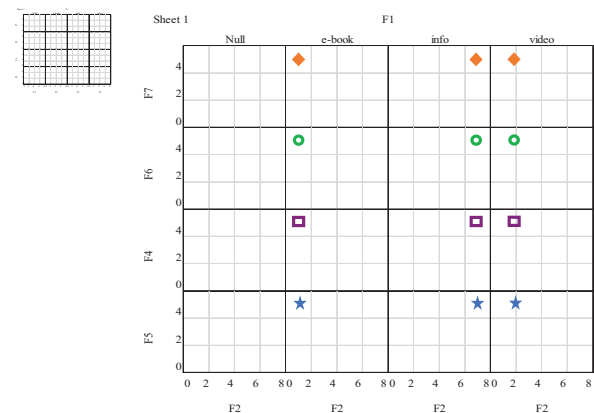
F5: Quality of media presentation

F6: Perception of the sample group

F7: Satisfaction of the sample group

Figure 11 was the presentation of a large amount of data from Tables 2–4 in one image. It could illustrate the use of three types of multimedia: infographics, videos, and e-book. It also included information related to content expert quality assessments, presentation media expert quality assessments, perception assessments, and satisfaction evaluations from the sample group towards multimedia produced during the past 2 years in the COVID-19 period.

It could be concluded that over the past two years, the educational institute has focused on designing and developing various types of public relations multimedia, with infographic posters being the most prevalent among the different media formats. Despite the diversity in media types, the studies showed similar levels of content quality, media presentation quality, and impact on the perception and satisfaction of the sample group.

**Figure 11** Data visualization with Tableau presentation

Discussion

All ten research studies in this synthesis followed the ADDIE Model, which involved problem analysis, information study, and research process planning (Chusangnil, 2012). The researchers utilized this model to guide their research design, which included analyzing problems, creating multimedia outlines, and developing multimedia content such as posters, infographics, motion graphics, and video clips. Online activities and special events, conducted through platforms like Zoom Meeting, were incorporated to engage the Generation Z students. The evaluation results indicated high levels of participation and motivation among the students.

Regarding the design and development of promotional multimedia, the studies featured a range of media formats, including infographic posters, video motion graphic clips with accompanying activities, video clips, and electronic books. These multimedia materials were disseminated through social media networks, aligning with the Covid-19 situation measures in Thailand at that time. The multimedia successfully met the expectations of Generation Z students, who are highly proficient in digital technology. Social media networks had become an increasingly significant platform for public relations, facilitating widespread communication and content sharing (Vichitrboonyaruk, 2013). The organization's Facebook page served as the primary channel for publicity, while other social media platforms such as TikTok and Instagram Reels were utilized to capture the attention of Generation Z students. This information mentioned was consistent with the research results from MarketBuzz (2021) who conducted a study on the media consumption behavior of 700 individuals across Thailand to confirm data regarding the various media channels impacted by the COVID-19 pandemic. This study also included additional research comparing the results to 2020. The surveyed individuals recorded their media usage throughout a week at different times: morning, afternoon, and evening, including both weekdays and weekends. The survey found that the most favored media channels among Thai people were social media, with 81 percent of respondents using it, followed by the internet at 65 percent, streaming video content at 50 percent, and television at 47 percent. The situation suggested that Thai people were ready to adapt to their previous way of life, with usage behavior remaining largely unchanged except for the time spent on these online platforms. From the data, it was evident that Thai people were increasingly valuing digital and mobile media. This indicated that

marketers or communicators needed to adjust, adopt new ways of thinking, and employ suitable communication strategies to connect with their target audience effectively. These were recommendations from researchers on using media to communicate with the target audience both during and after the COVID-19 pandemic, based on the previously mentioned data. The researchers' use of textual analysis in conjunction with data visualization was a powerful approach because these methods complement each other effectively. Textual analysis provided detailed, in-depth information, while data visualization presented this information in a concise and clear visual format. Therefore, it is advisable to start with textual analysis to gather rich data and insights and then conclude with data visualization to create a clear and understandable representation of the findings. This combined approach enhanced the research's depth and makes it more engaging for a wider audience. In summary, employing both textual analysis and data visualization techniques in research allowed for a more comprehensive and impactful exploration of the subject matter, making it more accessible and informative.

The quality of both content and media presentation in the promotional multimedia was rated at a very good level. Additionally, the perception and satisfaction of the sample group towards the multimedia were consistently high. These findings supported the research hypothesis and highlight the effectiveness of digital content, particularly multimedia, in capturing users' attention and influencing their behaviors (Bell, 2020). Effective public relations, including the design and development of multimedia, play a crucial role in shaping the image of an organization and an educational institute. Successful communication of work and information to the general public could be achieved through a dedicated multimedia department. Furthermore, data visualization skills had become essential for data scientists and analysts, as the process of effectively communicating information and summarizing data played a critical role in conveying insights to others (Data Innovation and Governance Institute, 2022). Based on the findings from the above research, recommendations for public relations professionals could be made in developing organizational public relations media, it was advisable to use multimedia media types, as this was most suitable for the target audience of Generation Z because they predominantly spent their time in front of screens on social media. Additionally, it was suggested to employ the ADDIE Model in the media development process, as it ensured a comprehensive research and development process according to the 5 phases in this model.

Conclusion and Recommendation

In conclusion, this synthesis of research studies has provided valuable insights for the faculty in designing and developing media to effectively promote public relations information among Generation Z students. It was recommended that the institution prioritize the content aspect and adopt modern and easily communicable forms of media on online platforms. By doing so, it could enhance the perception and satisfaction of the new generation audience.

The synthesis of data from ten research studies using both meta-analysis and data visualization through the Tableau program has proven to be effective. While meta-analysis allowed for detailed presentations of joint data, data visualization offered a concise and comprehensive presentation in a single image. It is suggested that future studies consider employing the t-test statistical method to evaluate the impact of promotional multimedia and public relations activities on the audience before and after their exposure. This approach would yield more prominent findings.

Furthermore, the researchers strongly recommended the utilization of the Tableau program as a tool for visually presenting text summaries. Its user-friendly interface and clear communication capabilities make it well-suited for effectively engaging the target audience.

In the future, it is important for educational institutions to continue exploring innovative approaches and adapting to emerging technologies to enhance public relations strategies and meet the needs and expectations of Generation Z students. Furthermore, from the research findings, it was discovered that the majority of students had a strong tendency to use social media and in multimedia-formats. These forms of media could effectively enhance awareness and satisfaction among this target group. Therefore, educators should consider developing teaching materials in multimedia formats such as infographics, video content, or e-books, and then distribute them on online platforms. This approach will make the learning materials more engaging and appealing to the students.

Research Limitations

Limited to published works on public relations multimedia for case studies at King Mongkut's University of Technology Thonburi (KMUTT) during the Covid pandemic, focusing on Generation Z students.

Findings may not fully represent the broader landscape of public relations multimedia development in other institutes or contexts.

Targeted sample group of Generation Z students may not reflect perspectives of other age groups or demographics.

Limited to the past two academic years, which may affect generalizability to future contexts.

Conflict of Interest

The authors confirm that there is no conflict of interest.

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