# Application of Visual Technology in University Film and Television Education and Its Impact on Learning Effectiveness

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**Abstract.** In this study, we explored the possibilities of visual technologies in the field of film and television education and their impact on learning outcomes. In the questionnaire and data analysis, it was found that the use of VR, AR, and IV can improve students' learning. Thus, immersive VR technology improves students' practical skills and interest in learning; AR technology improves students' level of understanding through virtual elements; and Intelligent technology multiplies the enjoyment of the learning process and students' initiative by integrating video content into a more interactive mode. The results obtained at the end of this study indicate that visual technologies should be considered as an effective financial development in film and university television education, which in turn will lead to the creation of highly skilled professionals. Based on the results of the study, it is concluded that it is worthwhile for colleges and universities to apply visual technologies in their programmes in order to achieve their educational goals. In addition, it is important that colleges and universities develop individualised teaching methods based on the different characteristics of learners.

**Keywords:** visual technology; virtual reality; augmented reality; interactive video; film and television education; learning outcomes

## 1 Introduction

### 1.1 Background

The visual devices are the main players in this subject, and those devices make the missionary education different. The utilization of procured visual gadgets like Virtual Reality (VR), Augmented Reality (AR), and real-time video clips have become the desired tools in film and television education improvement at the Higher Education Academy. These innovative approaches can revolutionize context-dependent learning when dynamic and real-world experiences are integrated into classroom learning (Chen & Mokmin, 2024; Denmead, 2024)[1][2].

Digital reality helps students to learn by constructing the virtual world that imitates the real one and lets them to be a part of the digital world. Such learning activities can also include entrance into a virtual set where cropping and compositions become evident as well as editing and visual effects make an appearance (Lin et al., 2023)[3]. Along with that, Augmented reality offer more intelligent learning environment as it projects real life situations in virtual

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format. As an instance, students might stare at virtual scenes and watch movie or TV have some kinds of visual effects with AR glasses to deepen their perception how these technologies are truly applicable in film or TV production processes (Wang & Mokmin, 2023)[7].

Interactive video is the vivid technology, which among others, elevates both initiative and effectiveness of education by growing the interactivity of video content and guiding the viewing of the range of materials so that students learn to pick and manipulate units of information. This tech does not only pertain to the content but it also gives the teachers additional technologies to make classroom more tanging and amusing (Mariappan et al., 2023)[4].

Visual technologies are being tenaciously shaped with the help of science and technology development. Such technologies are therefore readily available to be applied in the field of film and TV education. Apart from capturing the students' learning interest, the visual technologies are found to immensely level up students' professional skills and the ability to handle any practical and situation that may occur in the line of their professions, thereby laying a very strong foundation for the successful career they wish to build Therefore, consider it to be rather practical and of very high research importance that ways to effectively use the visual technologies in movie and TV education in colleges and their impact on learning outcomes be considered (Muradyan, 2023; Prabhu et al., 2023)[5][6].

### 1.2 Significance

Yet there is a gap in literature due to a lack of empirical evidence and studies on the effect of visual technologies on learning in film and television education in particular. The aim of this research is to close this gap by analyzing how these technologies influence students' engagement, understanding, and skill growth.The AugmentedClass application has significantly increased graphic capabilities, interest in the studying, and creativity to be increased at students 5-7 age through augmented reality project development. By this, using of visual technologies in education is not all about this increasing of their cognitive prospect, but participating students in the development of both creativity and motivation of learning on their own hand.

In the area of cognitive as well as affective engagement the students acknowledged video technology’s vital role. However, their behavioural engagement showed that educators need to explicitly mention how video resources fits into the curriculum on an annual basis. This phenomenon implies that, notwithstanding the visual technologies are capable of perfecting learning occurrences of the students, their praiseworthiness depends on the instructor guidance as well as application of the resources.

The recent diverse global research shows that visual learning of the arts in higher education from 2000 to 2022 has significantly led to the development of students' cognitive and professional skills which is a big advantage to the students. Thus, the study points to the promise of visual technologies as a means for students to develop and then expand the range of the vital skills they possess. Further, through these projects, students have bettered their eyesight, their understanding of graphic design, and the skills they have by means of workshops, trainings and by doing design work that indicates how important visual technology is in education.

Hence, together with the use of the visual technology tool in the field of film and television education, the learning interest of students will be great and the participation will be obviously increased as well as the professional skills and the practical ability of them will be much strengthened, which will be the very foundation for being able to go much further in their future careers. Hence, the enlightment that visual technology bring is highly significant to our mean of practicality and representation of our research in educational background, for the film and television in universities and colleges.

### 1.3 Objectives

RO1: Investigating the functions of visual apparatus as a tool of learning technologies in the higher education process within film and television areas.

RO2: Establish variations of the effectiveness of distinction functionalities of visual technologies aimed toward different groups of students through data analysis.

RO3: Give advice on effective models for the application of visual technology in film and TV educational programmes aimed at improving educational outcomes.

### 1.4 Research questions

RQ1: What specific techniques of visual technology does higher education apply to screen-based training in cinema and television?

RQ2: To what extent has visual technology improved the learning and interaction of the students?

RQ3: Does student's attitude towards visual technology diverge according to the demographic indicators?

RQ4: In what ways can colleges and universities take advantage of visual technologies as they device an education strategy for film and television courses?

## 2 Conceptual framework

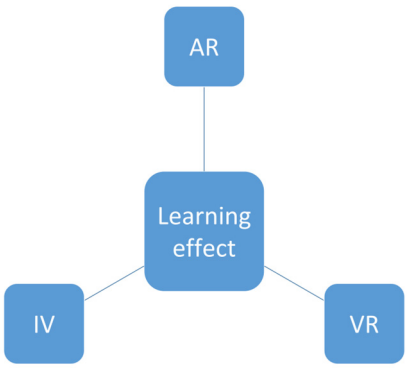


**Figure 1** (Conceptual Framework)

Figure 1 below is used to illustrate the conceptual framework of the study by specifying the relationship that the VR, the AR and IV as independent variables have with student engagement and learning outcomes as dependent variables.This model postulates that the VR, AR, and IV technologies can make a breakthrough improvement in the student interactivity and the learning outcomes by providing the immersive and interactive learning environment.The incorporation of these digital breakthroughs creates the optimal way of teaching and learning involving hands-on and immersive learning, leading to better understanding, retention of topics, and more practical skills on the side.In addition, the deployments of these technologies develop students' attention and interest on learning, and this is reflected in the final results of the learning process.

## 3 Research methodology

### 3.1 Study design

This study employed a questionnaire to evaluate the influence of media technologies on learning.The surveyed was created to identify amateur students' opinions of how VR, AR, and IV can be effectively used in film and TV education and how they perceive student learning outcomes.The survey covered both multiple choice and open ended items which elicited information from students on their background, visual technologies usage, and the role of applied technology in the learning process through engagement and effectiveness.Control of the quantitative analysis of students' responses is achievable by considering the students' responses, making it possible to get the full grasp of the genuine effects of visual learning in education and thus recommend qualitative future use of visual technology.

### 3.2 Questionnaire design

This survey will collect the demographic information of students and then evaluate their HDVT experiences.The first part of the questionnaire will cover basic population elements like gender, age, education and major. The aim is to establish the individual understanding and use of visual technology among certain groups.

The last section of the program would employ a 5- point scale on which students will evaluate their participation, response, and precision.The scale options range from "strongly disagree" (1 point) to "strongly agree" (5 points) with specific questions including:The answers have referred to my experiences that virtual reality (VR) technology has increased my engagement in learning.

The AR technology is a great tool that helps to understand things which are not available in the physical realm.

Being able to deal with practical tasks I found that IV (Interactive video)has helped me to better develop practical skills.

I think these visual techniques add more colors to my learning and therefore make it much easier process for me than usual.

I am content with expanding these skills for my education.

To be asked these questions helps us to support an overall level of student's visual meaning.

### 3.3 A stratified random sampling technique and a large variety of samples.

A stratified random sampling tactic was used in order to ensure that the sample was large enough and included students with various demographic characteristics to give a representative account of the entire students on campus.The target samples size was 200 and the minimum criteria sample size was 132 to maintain high statistical accuracy.

### 3.4 Data collection

The data will be carefully compiled over a span of two weeks through an online survey and a well-organized interview process.In order to achieve response before certificates of participation will be provided when the correction are made.The collected data will be evaluated by means of statistical computer software.

## 4 Results

**Table 1** Frequency analysis results

| name (of a thing) | options (as in computer software settings) | Frequency | Percentage (%) | Cumulative percentage (%) |
|---|---|---|---|---|
| distinguishing between the sexes | women | 101 | 50.50 | 50.50 |
| | male | 99 | 49.50 | 100.00 |
| (a person's) age | 18.0 | 30 | 15.00 | 15.00 |
| | 19.0 | 29 | 14.50 | 29.50 |
| | 20.0 | 22 | 11.00 | 40.50 |
| | 21.0 | 36 | 18.00 | 58.50 |
| | 22.0 | 22 | 11.00 | 69.50 |
| | 23.0 | 38 | 19.00 | 88.50 |
| | 24.0 | 23 | 11.50 | 100.00 |
| grade | first-year university student | 59 | 29.50 | 29.50 |
| | third-year university student | 44 | 22.00 | 51.50 |
| | second-year university student | 43 | 21.50 | 73.00 |
| | fourth-year university student | 54 | 27.00 | 100.00 |
| professions | communication studies | 48 | 24.00 | 24.00 |
| | anime | 48 | 24.00 | 48.00 |
| | film and television production | 51 | 25.50 | 73.50 |
| | digital media | 53 | 26.50 | 100.00 |
| add up the total | | 200 | 100.0 | 100.0 |

From the above table, it can be seen that 50.50 per cent of the sample chose "female". The percentage of male sample is 49.50 per cent. 19.00 per cent of the sample would choose "23.0". In terms of grade, there are relatively more "freshmen" in the sample, with a proportion of 29.50 per cent. In terms of major, more than 20% of the samples are "Digital Media"(As shown in **Table 1**).

**Table 2** Pearson's correlation-delta format

| | VR technology has increased my engagement in learning | AR technology has enhanced my understanding | Interactive videos have helped me to better develop practical skills | Visual technology makes the learning process more fun and interactive | Satisfaction with learning using these techniques |
|---|---|---|---|---|---|
| VR technology has increased my engagement in learning | 1 | | | | |
| AR technology has enhanced my understanding | 0.750** | 1 | | | |
| Interactive videos have helped me to better develop practical skills | 0.779** | 0.753** | 1 | | |
| Visual technology makes the learning process more fun and interactive | 0.779** | 0.784** | 0.738** | 1 | |
| Satisfaction with learning using these techniques | 0.779** | 0.746** | 0.759** | 0.763** | 1 |

* $p<0.05$ ** $p<0.01$

From the table above, correlation analysis was used to investigate the correlation between VR technology increased my engagement in learning, AR technology enhanced my comprehension, interactive video helped me to better develop my practical skills, visual technology made the learning process more interesting and interactive and satisfaction in using these technologies for learning respectively, and the Pearson's correlation coefficient was used to indicate the strength of the correlation. The Pearson correlation coefficient was indicated by a positive and substantial correlation(As shown in Table 2). Specific analyses show that:

The Spearman's correlation coefficients between the two variables of VR technology and the increase in my engagement in learning, and my increase in the satisfaction with learning using these technologies are significant,they are 0.779 and 0.935 respectively, if they are positive that means there is an increase with the VR technology that increases in my engagement in learning and an Majority of the items ranging from the AR technology helped me in understanding better and the effect of the AR technology satisfaction with learning using these technologies were mean significant with a correlation coefficient of 0.746 and 0.118 respectively they are all greater than 0 which indicates a positive correlation between virtual reality technology efficacy and satisfaction with using these technologies(As shown in **Table 2**). Everything, that we have just discussed, like Interactive videos helped me to develop better

practical skills and Satisfied during using these technologies, is of vital importance with a correlation coefficient value amounting to 0.759 and that coefficient value is above from zero, hence meaning that it is the individual based on Interactive videos who develops better and practical in technology and Satisfies with the learning process.

However, in all of the items which were directed at making the learning process still more interesting and interactive using the visual technologies and satisfaction obtained from learning using these technologies, yielded a significant correlation coefficient value of 0.763 and the correlation coefficient is quite greater than 0, is therefore implies that there is a positive correlation(As shown in **Table 2**).

## 5 Discussion

### 5.1 Impact on the effectiveness of education

This study performs with a questionnaire survey and data analysis to establish the key roles that visual technologies play in film and television education in colleges and universities. In the data analysis, it is found that among the various technologies - VR, AR, IV - all of these technologies are more or less helpful in increasing the students' engagement and satisfaction (Average engagement and average satisfaction of the students increased post-use of the aforementioned learning technologies). To point out, those who use VR technology clearly show an increased interest in learning, practical skills are also developed as to be noticed. The efficiency of AR technology focuses on students comphrehion skills and the interactivity and fun of the learning process improved because of the interactive video, too. Regression analysis was then used to confirm the high and positive correlation between the application of these digital technologies and the learners' academic satisfaction.

And this is where students with diverse backgrounds react differently to technology than those with similar backgrounds. The two samples (ones with mono viewers and colored viewers) will differ in their response to ads. Thus, a full evaluation of packaging and product visual components will be provided. The outcomes differ by gender because males and females have the different effects of such technologies. This notion is backed by the distinction among grade levels and major that made a difference. On one hand, visual technologies which have widely proved to be of immense utility in multidisciplinary fields include those of medicine and entertainment among others, have shown beneficial educational effects for both schools and students of different categories. Necessity to improve and adapt mode of this technologies application strategies may be required according to the educational context they are used in and student backgrounds.

### 5.2 Limitations

We can point out some considered restrictions in this study. Initially, the sample size is the only limitation as a statistical tool even though it is equal to the minimum requirement may not represent all the student groups in a given situation and so won’t be applicable outside the limitations of the study as the analysis was an exploratory analysis. The different areas of future T research include sampling that covers a larger part of the population, and an increased number of respondents, to could the sample and results of the current study. In addition, the

main method of the data collection of the present study was the adoption of online questionnaires, which then could bias the response and/or the report data could have been subjective. Upon such future studies, data collection methods can be diversified by amongst the things classroom observations and experimental studies to bring little of questions and whom to it. As well, this study has been only limited to how visually aided devices are implemented in higher education, but some researchers could examine other possible ways of its implementation and its effect in the other higher education sectors.

# 6 Conclusions and recommendations

## 6.1 Conclusion

We notice that visual technology has significant influences in the film and television education especially in college where learning, engagement and students' satisfaction is improved.Overall, VR provides students with an immersive experience that allows them to not only develop their practical skills but also get interested in learning; AR improves students' ability to retain information by overlaying digital information, and the interactivity of video content is taken to the next level by IV, which engages students in a more interactive and fun learning process.These results prove that the importance of visual technology for college education has more our potential to maximize how the quality of the teachings and the learning effect of students are pursued.

## 6.2 Recommendations

Consequently, in the light of the research results, one can propose as universities engage the film and television education courses by means of innovative visual technologies, particularly virtual reality (VR) and augmented reality (AR), to utilize to the full their immersive and interactive aspect as well as to improve the students` learning engagement and satisfaction.On the other hand, for the practical utilization of visual media, individualised teaching methods by which the features of the various target groups to maximize the effect of visual media should be adopted.Next studies would be aimed at the examination of the influence of visual technologies on teaching and learning in different subfields, especially long-term effects and best practices for the integration of the technology.

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