

# Instructional media and students' conceptualization of intended learning: The justification and verification of correlation

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## Abstract

The debate on the effectiveness of instructional media in conceptualization of intended outcomes, centers on whether a correlation exists or not between instructional media and students' conceptualization of intended learning outcomes. The debate is still on from the time of Clark/Kozma's argument of 1994. The objective of this study was to justify and verify, if there is a correlation between instructional media and students' academic achievement, at tertiary level of education in Botswana. To achieve this objective, a survey method was adopted. The research instrument used was a questionnaire. A sample of 300 tertiary educators was identified. A probability sampling procedure was used, employing multistage sampling technique. A statistical procedure SPSS was used to analyze data. It was concluded that, there was a strong, positive correlation between instructional media and tertiary students' conceptualization of intended learning outcomes in Botswana. The positive correlation is seen to account up to 50% more or better in conceptualization of intended learning outcomes when comparing students taught using instructional media, against students taught using the traditional ways of instruction. It therefore recommends that Management of institutions should take a lead to make instructional media a priority and key component of effective teaching and learning process at tertiary level of education in Botswana.

## Key words

**Instructional media, intended learning, conceptualization, justification verification, correlation.**

## Introduction

"The media and learning debate will likely carry on; whatever the study, proponents in either camp will likely find fault with it." (Materi 2000:3). The debate on the effectiveness of instructional media in conceptualization of intended outcomes has been going on and still is going on because the two schools of thought about instructional media effect have not arrived at agreed conclusion. The origins of this debate started when Richard Clark's article published in 1983 down played the role of media to a mere delivery mechanism (Moffat 2013:1). Ten years later, Kozma wrote a rebuttal to Clark's contention thus began the debate of media versus method (Moffat 2013). This debate brought two schools of thought on the effectiveness of instructional media in academic achievement, when Kozma in 1994, opposing Clark contended that, Instructional media itself can influence teaching and learning under certain conditions and with proper process, and in this case a correlation exists. Kozma believes that instructional media could and should be used more than a vehicle for delivery. He viewed both instructional media and method to have a crucial role in the design of instruction (Moffat 2013). Kozma discussed how books, television and computers influenced the process of learning, connected learners to their prior knowledge, and helped learners to understand complex concepts (Moffat 2013). Whereas, on the other hand, Clark in 1994, argued that; "it is the method rather than media that influences academic achievement." (Marx. 2006:02). The basic idea of Clark's argument is that teaching methods have the most influences on learning. There is no correlation between instructional media and students' conceptualization of intended learning outcomes. Instructional media is merely a delivery device and has no significant difference in learning outcomes (Moffat 2013). Clark (1983) argues that, the media comparison studies do not

acknowledge other confounding variables such as the method, the teacher, the content and the environment; which play a significant role in teaching and learning process. Thus Clark (1983:445), concludes, "The best current evidence is that media are mere vehicles that deliver instruction but do not influence students achievement any more than the truck that delivers our groceries causes changes in our nutrition." Put simply Clark (1983), argued that, it is not instructional medium, but, the content, that enhances the conceptualization of intended learning outcomes. Clark (1983:456), argues, further that "All current views of media comparison studies suggest that we will not find learning differences that can unambiguously attributed to any medium of instruction. It seems that existing research is vulnerable to rival hypotheses concerning the uncontrolled effects of instructional method and novelty."

On the other hand, Kozma (1994) argues that, media can influence learning, and that instructional media can enhance conceptualization of intended learning outcomes. Kozma (1994) argues that, instructional media influence learning under certain conditions with proper process, here Kozma's argument is that one cannot say with certainty that instructional media cannot influence learning, when instructional media influences learning in certain conditions. Kozma contends that, the studies, carried out which Clark (1983) refers to, failed to establish a relationship between instructional media and learning because the theories, research and designs have been constrained by vestiges of behavioral roots from which the discipline of education sprang(Kozma 1994:2).

## 2.0 Literature review

The instructional media effect schools of thoughts Centre on, whether, instructional media do influence academic achievement or not? The strong correlation view school of thought suggest that there is a positive correlation between instructional media and students' conceptualization, whereas the weak correlation view school of thought, seems to suggest that there is negative correlation between instructional media and students' conceptualization of intended learning outcomes. These two schools of thought are briefly looked at below.

The notion of strong correlation effect school of thought is that there is a correlation between instructional media usage and students' conceptualization of intended learning outcomes. The strong correlation school of thought claims that, instructional media influence academic performance of students. This means that, learners who are exposed to instructional media learn more and perform better academically than those who are not exposed to instructional media, in other words, instructional media enhance conceptualization of intended learning outcomes. There are several researchers, such as; Mwei, Too, and Wando (2011), who also investigated, "computer assisted instruction on student's attitudes and achievement in matrices", found that there was a significant difference between students who used computers and those who did not and they concluded that there was a significant difference in the Mathematics achievement.

In other words CAI improves academic achievement of learners. Thus the findings of Mwei et al (2011), confirm the strong media effect theory, that instructional media enhance conceptualization of intended learning outcomes, thus a correlation exists.

The above research findings are also consistent with the findings of the Software and Information Industry Association (SIIA), which studied 311 research reviews and original research projects and reported that "Positive effects have been found for all major subject areas, in preschool, through higher education and for both regular and special needs students..." (SIIA 2000:4).

Marx (2006:9), who also studied a number of research findings, on the effectiveness of instructional media in the teaching and learning process, concluded from a number of studies that, "I believe that the studies used in this paper show that media can influence learning. When Technology is applied using unique and innovative methods." Marx (2006), is in agreement with Kozma (1994)'s assertion that instructional media and instructional method are inseparable. This assertion of Marx (2006) is in agreement and is supported by the International Society for Technology in Education (ISTE 2008), that monitored studies on the effectiveness of education technology on student outcomes for more than 20 years, concluded that, "When implemented appropriately, the integration of technology into instruction has a strong positive impact on student achievement"(p5). The mentioned scholars above show that a correlation exists between instructional media and students' conceptualization of intended learning outcomes.

The weak correlation school of thought state that there is negative correlation between instructional media used during teaching and learning process and students' conceptualization of intended learning outcomes. The weak correlation school of thought purports that media do not influence academic achievement or conceptualization of intended learning outcomes. In other words, there are no academic achievement benefits for using instructional media, and there is no distinction in terms of performance between those students who receive instruction with instructional media and those without instructional media. Kennewell and Beauchamp (2003), who found out that, technology, had no impact on teaching and learning. When they compared Interactive whiteboard (IWB) and networked PCs. Similarly, Selimoglu and Arsoy (2009) carried out a study, on the effect of PowerPoint preferences of university students on their performance. They found that; there was no identifiable effect of instructional media on conceptualization of intended learning outcome, meaning that, instructional media do not improve the academic performance of the learners at all.

Thrasher, Coleman and Atkinson (2011), who carried out a comparison study on web-based versus classroom instruction, and they concluded that, there was no difference between web based instruction and classroom instruction. Thrasher et al (2011) comment thus: "The mixed results of this study further suggest that perhaps the real effect on student performance is not solely the delivery method, but rather a combination of instructional technologies, delivery method, richness of instructional media, and individual differences among students." Their comment is in line with (Clark 1983; Max 2006; ISTE 2008; Cradler and Bridgforth 2005), who have also observed that; it is not instructional media per se, that enhance conceptualization of intended learning outcomes, but a number of factors do impinge upon the conceptualization of intended learning outcomes. In this case, there is no correlation between instructional media and students' conceptualization of intended learning outcomes.

### 3.0 Statement of the problem & research objectives/questions

The instructional media effectiveness is still going on because researchers need to find out whether a correlation exists or not between instructional media and students' conceptualization of intended learning outcomes. Therefore, objective of this study was **"To justify and verify, if there is a correlation between instructional media and students' academic achievement, at tertiary level of education."** This objective sought to find out if a relationship exists or not between instructional media and tertiary students' academic achievement, so as to justify and verify the existence of a relationship (correlation). This study had the following two research questions:

**3.1** What are the other benefits of using instructional media during the teaching and learning process, other than the currently debated conceptualization effect at tertiary level of education?

**3.2** What is the relationship between instructional media and students' academic achievement?

### 4.0 Methodology

#### 4.1 Research design

This study followed the survey method, which Neuman (2007:167) sums up a survey method as follows: "Surveys are appropriate for research questions about self-reported beliefs or behaviors. They are strongest when the answers people give to questions measure variables." The survey method is appropriate to this study because by its nature, it is one of the best ways to find the opinions or perceptions of tertiary educators on correlation between instructional media and tertiary students' conceptualization of intended learning outcomes in Botswana. A questionnaire for this study had 22 question items, of which, questions 9 to 17 of the questionnaire apply to this study question: **The justification and verification of correlation between instructional media and students' academic achievement.** A total of 183 out of 300 questionnaires were returned (61%) and this was considered to be sufficient for this study, following a cue from Babbie (1997)'s mark of 60% return rate on surveys.

#### 4.2 Population and Sampling

The population comprised of all tertiary institutions in Botswana registered and accredited by either Botswana training authority (BOTA) and or by Tertiary Education Council (TEC). By 2010, BOTA had registered 284 training institutions

(10<sup>th</sup> anniversary commemorative brochure page12) and TEC 36 institutions (TEC student directory 2011/2012:23). The population is composed of public, private, community owned, some by both government and private, some specializing in a certain program, and some offering variegated programs. The reason was to get a fair representation of all tertiary institutions in Botswana. The target respondents were the educators in these tertiary institutions and those who hold positions of responsibilities such as Principals, Vice principals, Deans, Campus managers, Coordinators, Centre Managers, Heads of departments, et cetera. BOTA had 3280 accredited trainers (World TVET Database Botswana 2012:12). This study used probability sampling procedures-multi stage sampling technique, and this was done to increase the degree of representativeness and heterogeneity in the sample for generalization purposes, because, of the heterogeneity in the tertiary education sector, brought about by the following factors: ownership, entry points, programs offered. A total of 300 respondents were sampled.

#### 4.3 Data presentation and analysis

The Objective was to justify and verify, if there was a correlation between instructional media and students' academic achievement, at tertiary level of education. This objective sought to find out if some relationship existed between instructional media and tertiary students' academic achievement. In order to meet this objective, the research question one was phrased as follows: What are the other benefits of using instructional media during the teaching and learning process, other than the currently debated "conceptualization effect" at tertiary level of education? This question required respondents to give the other benefits they derived in using instructional media during the teaching and learning process in their respective institutions.

Respondents were given question 9 as to facilitate response to question one as follows: There are some benefits other than academic achievement associated with the use of instructional media in the teaching and learning process. Do you agree or disagree? This question asked whether respondents realized or experienced other benefits associated with the use of instructional media during the teaching and learning process other than the academic achievement of the learners. The following were the response to question 9 on Table 4.3.1.

**Table 4.3.1: Other benefits of instructional media**

RESPONSE TO INSTRUCTIONAL MEDIA BENEFITS	FREQUENCY	PERCENT	VALID PERCENT
Strongly agree	70	38.3	39.3
Agree	88	48.1	49.4
Not sure	12	6.6	6.7
Disagree	4	2.2	2.2
Strongly disagree	4	2.2	2.2
<b>TOTAL</b>	<b>178</b>	<b>97.3</b>	<b>100.0</b>
Did not indicate	5	2.7	
<b>GRAND TOTAL</b>	<b>183</b>	<b>100</b>	

Table 4.3.1 shows that 38.3% strongly agreed that there were other benefits. 48.1% of the respondents agreed that there were other benefits of using instructional media in the conceptualization of intended learning outcomes at tertiary level. 6.6% were not sure whether they were other benefits of using instructional media at tertiary level of education. 2.2%

disagreed that they were other benefits besides the “conceptualization effect” and 2.2 % of respondents strongly disagreed that they were other benefits of using instructional media at tertiary level. Therefore, 86.4% of respondents agree to strongly agree that there were other benefits of using instructional media at tertiary level of education.

Yet in order to address fully the objective, the second research question was presented: What is the relationship between instructional media and students’ academic achievement? This research question sought respondents to express the type of relationship between instructional media and tertiary students’ conceptualization of intended learning outcomes. This question was the core of this study as it tried to find out the relationship between instructional media and tertiary students’ conceptualization. A couple of questions were developed as indicated; questions 10, 11, 12, 13, 14, 15, 16, and 17, were asked the respondents in order to address the stated research question two.

Question ten (10) was expressed as: In your own opinion is there any difference in academic performance among students taught using instructional media from those taught using traditional ways? Table 4.19 shows the responses given out by respondents.

**Table 4.3.2 Opinion on difference(s) in academic performance**

OPINION	FREQUENCY	PERCENT	VALID PERCENT
There is a difference	145	79.2	81.0
No opinion	23	12.6	12.8
Did not indicate a response	4	2.2	2.23
There is no difference	11	6.0	6.1
<b>TOTAL</b>	<b>179</b>	<b>97.8</b>	<b>100.0</b>
<b>GRAND TOTAL</b>	<b>183</b>	<b>100.0</b>	

The table 4.3.2 above shows that 79.1% of the respondents said there were differences in academic performance among students taught using instructional media from those taught using the traditional ways. 12.6% had no opinion. 2.2% of the respondents did not indicate their own opinion. 6% of the respondents indicated there were no differences in academic performance among students taught using instructional media from those taught using the traditional ways. Therefore, it was concluded that the overall view of the respondents in Botswana was that there was a positive difference in academic performance between tertiary students who are taught using instructional media versus tertiary students who are taught using traditional ways of instruction.

Question eleven (11) was a follow up to question ten and it was crafted as follows for the respondents: Select a comment for your response in question 10 above. Question eleven required respondents to justify their responses in question (10) above.

**Table 4.3.3: Respondents’ comment for their response in question 10 above**

PERFORMANCE	FREQUENCY	PERCENT	VALID PERCENT
Students who are taught using instructional media perform better academically	123	67.2	70.7
Students who are taught using traditional ways perform better academically	6	3.3	3.4

No comment on the two systems of teaching above	32	17.5	18.4
The students generally perform the same academically	13	7.1	7.5
<b>Total</b>	<b>174</b>	<b>95.1</b>	<b>100.0</b>
Did not provide any comment	9	4.9	
<b>Total</b>	<b>183</b>	<b>100.0</b>	

The following were the comments from 183 respondents in table 4.3.3 above; 67.2% of the respondents commented that “Students who are taught using instructional media perform better academically.” 3.3% of the respondents commented that “Students who are taught using traditional ways perform better academically.” 17.5% had “no comment of the two systems of teaching above.” 7.1% of the respondents commented, “The students generally perform the same academically.” 4.9% of respondents did not provide any comment. It was concluded that the general view of respondents in Botswana was that instructional media enhance tertiary students’ conceptualization of intended learning outcomes, since 70.7% of respondents agreed that students who are taught using instructional media perform better academically against 3.4% who think otherwise. This view of respondents in Botswana supports the strong media effect school of thought represented by Kozma in the Clark/Kozma debate on the effectiveness of instructional media in conceptualization of intended learning outcomes.

Question twelve was: In your opinion, what would you suggest as the average percentage gain of students taught with instructional media against the students taught using traditional ways in their academic performance? This question required the respondents to use their own experience to estimate the percentage gain of students taught using instructional media over those taught without; which could be attributed to the use of instructional media, in relation to students’ academic achievement. The following table 4.3.4 presents the suggested average percentage gain by the respondents.

**Table 4.3.4: Suggestion on average percentage gain**

OPINION ON PERFORMANCE	FREQUENCY	PERCENT	VALID PERCENT
They perform 50% or better more than their counterparts	102	55.7	61.4
They perform 30-49% more than their counterparts	33	18.0	19.9
They perform 10-29% more than their counterparts	23	12.6	13.9
They perform 1-9% more than their counterparts	8	4.4	4.8
<b>Total</b>	<b>166</b>	<b>90.7</b>	<b>100.0</b>
Did not give opinion on average performance	17	9.3	
<b>GRAND TOTAL</b>	<b>183</b>	<b>100.0</b>	

The results from the table 4.3.4 shows that 61.4% of respondents said the average percentage gain of students taught with instructional media against students taught using traditional ways in their academic performance was that students taught

using instructional media “performed 50% or better, more than their counterparts”. 19.9% of the respondents indicated that on the average percentage gain of students taught with instructional media against students taught using traditional ways in their academic performance was that students taught using instructional media “They performed 30-49% more than their counterparts.” Moreover, 13.9% of the respondents said the average percentage gain was 10-29% more than their counterparts. Furthermore, 4.8% of the respondents reported that the average percentage gain of students taught with instructional media against students taught using traditional ways was 1-9% more than their counterparts. Finally, 81.3% of respondents believe students taught with instructional media perform academically between 30% to 50% or better than those e students who are not taught using instructional media.

Question thirteen was a follow up to questions 10, 11, and 12 and was crafted as: Make a comment about your choice of responses in questions 10, 11 & 12 above. This question thirteen asked respondents to make a comment for their choices of responses in question (10), “In your own opinion, is there any difference(s) in academic performance among students taught using instructional media from those taught using the traditional ways?” Question (11) “Select a comment for your response in question 10 above” and question (12), “ In your opinion, what would you suggest as the average percentage gain of students taught with instructional media against the students taught using traditional ways in their academic performance?” The following table 4..3.5 shows the comments made by respondents.

**Table 4.3.5: Respondents’ Comment on choice of their responses in questions 10, 11 & 12**

COMMENT ON QUESTIONS 10, 11 AND 12	FREQUENCY	PERCENT	VALID PERCENT
Motivation, attentiveness, widens the scope of knowledge	56	30.6	83.6
Both instructional media and traditional media complement each other	9	4.9	13.4
Traditional ways of teaching are better	2	1.1	3.0
<b>TOTAL</b>	<b>67</b>	<b>36.6</b>	<b>100</b>
NOT COMMENTED	70	38.3	
<b>GRAND TOTAL</b>	<b>183</b>	<b>100</b>	

Valid percentages show 83.6% of respondents, commented that instructional media provided “Motivation, attentiveness, and widens their scope of knowledge.” 13.4% of respondents, commented that, “Both instructional media and traditional media complemented each other.” 3% of respondents commented that, “Traditional ways of teaching were better.”

Therefore, it was concluded that 83.6% of the respondents in Botswana, commented that instructional media provided “Motivation, attentiveness, and widened the tertiary students’ scope of knowledge.”

Question fourteen was one of the core questions phrased as follows: Is there any relationship between instructional media and tertiary students’ conceptualization of intended learning outcomes? The purpose of this question was to find out from respondents whether there was a relationship existing between instructional media and student conceptualization of intended learning outcomes, from their own knowledge, educational experience and understanding. The following table 4.3.6 presents the responses to question fourteen.

**Table 4.3.6: Relationship between instructional media & conceptualization**

RESPONSES	FREQUENCY	PERCENT	VALID PERCENT
Yes	104	56.8	59.8
Somehow yes	45	24.6	25.9
I don't know	18	9.8	10.3
Somehow no	1	.5	.6
No	6	3.3	3.4
<b>TOTAL</b>	<b>174</b>	<b>95.1</b>	<b>100.0</b>
Did not Respond	9	4.9	
<b>GRAND TOTAL</b>	<b>183</b>	<b>100.0</b>	

In table 4.3.6, 56.8% of respondents said "Yes" there was a relationship between instructional media and tertiary students' conceptualization of intended learning out comes. 24.6% of respondents said "somehow yes". 9.8% of respondents said, "they did not know" if there was any relationship between instructional media and tertiary students' conceptualization of intended learning out comes. 0.5 % indicated "Somehow no". 3.3% indicated "No" relationship between instructional media and students' conceptualization of intended learning outcomes.

It was concluded that 85.7% of respondents in Botswana reported there was a relationship (correlation) between instructional media and tertiary students' conceptualization of intended learning outcomes.

Question fifteen, followed: How would you describe the relationship you have identified in question 14 above in terms of tertiary students' conceptualizations of intended learning outcomes? This question sought respondents to describe the relationship between instructional media and tertiary students' conceptualization of intended learning outcomes, as they had identified in question (14) above. Table 4.3.7 shows the respondents' descriptions of the relationship between tertiary students' conceptualization of intended learning out and instructional media used in teaching and learning process.

**Table 4.3.7: Description of the relationship**

DESCRIPTION OF RELATIONSHIP	FREQUENCY	PERCENT	VALID PERCENT
Positive	98	53.6	57.6
Somehow positive	42	23.0	24.7
Not sure	22	12.0	12.9
Somehow negative	6	3.3	3.5



Negative	2	1.1	1.2
<b>TOTAL</b>	<b>170</b>	<b>92.9</b>	<b>100.0</b>
Did not give descriptions	13	7.1	
<b>BRAND TOTAL</b>	<b>183</b>	<b>100.0</b>	

The table 4.3.7 shows valid percentages: 82.3% of the respondents described the relationship between instructional media and tertiary students' conceptualizations of intended learning outcomes as **somehow positive** to **positive** relationship. 12.9% of the respondents were not sure how to describe the relationship. 3.7% of the respondents said **somehow negative** to **negative** relationship.

Question sixteen of this objective was phrased as follows: How do you rate your description of the relationship which you identified in question 15 above, in terms of tertiary students' conceptualization of intended learning outcomes? This question wanted the respondents to rate their descriptions which they had identified in question (15) above using ordinal scale provided of the relationship between instructional media and tertiary students' conceptualization of intended learning outcomes. The following Table 4.3.8 presents the results of question sixteen.

**Table 4.3.8: Rating Respondents' description in question 15**

VARIABLES	FREQUENCY	PERCENT	VALIDPERCENT
Very strong	45	24.6	26.8
Strong	91	49.7	54.2
No opinion	24	13.1	14.3
Weak	6	3.3	3.6
Very weak	2	1.1	1.2
<b>Total</b>	<b>168</b>	<b>91.8</b>	<b>100.0</b>
Did not respond	15	8.2	
<b>Grand Total</b>	<b>183</b>	<b>100.0</b>	

Results from table 4.3.8 shows that 26.8% of the respondents rated their description of relationship between instructional media and tertiary students' conceptualizations of intended learning outcomes as a **very strong** relationship. 54.2% of the respondents rated their description of relationship between instructional media and tertiary students' conceptualizations of intended learning outcomes as a **strong** relationship. 14.3% of the respondents had **No opinion** on rating their descriptions of relationship between instructional media and tertiary students' conceptualization of intended learning outcomes. 3.6% of the respondents rated their description of relationship between instructional media and tertiary students' conceptualizations of intended learning outcomes as a **weak** relationship. 1.2% of the respondents rated their description as a **very weak** relationship.

Question seventeen is the last question of this study, this question was presented as: Give reason(s) for your responses in questions 14, 15 &16. The purpose of this question was to provide the respondents with an opportunity to express personal reasons for their responses to question (14) - is there any relationship between instructional media and tertiary students' conceptualization of intended learning out comes? Question (15) -How would describe the relationship you have identified

in question 14 above in terms of tertiary students' conceptualization of intended learning outcomes? And question (16)-how do you rate your description of the relationship which you identified in question 15 above, in terms of tertiary students' conceptualization of intended learning outcomes? The following Table 4.3.9 provides a summarized thematic reasons form respondents.

**Table 4.3.9: Respondents reasons for questions 14, 15 16**

REASONS	FREQUENCY	PERCENT	VALID PERCENT
Visual instruction, skills, improved learning, interest , organized	38	20.8	39.1
Easy to use, active participation, better results	21	11.5	21.6
Helps in communication, more interesting, gain appropriate skills	26	14.2	26.8
Tertiary students are responsible	2	1.1	2.1
Do not use Instructional media	8	4.4	8.2
Advancement of technology	2	1.1	2.1
<b>TOTAL</b>	<b>97</b>	<b>53.1</b>	<b>100</b>
Did not give reason(s)	86	46.9	
<b>GRAND TOTAL</b>	<b>183</b>	<b>100</b>	

The table 4.3.9 shows that 38.1% of the respondents gave the following reasons: that instructional media gave visual instruction, skills are improved, and improved learning, aroused interest, and learning became organized. 21.6% of the respondents gave the following reasons: Easy to use, active participation of learners, and better results. 26.8% of the respondents gave the following reasons: instructional media helped in communication, instructional media made learning to be become more interesting, students gained appropriate skills. 2.1% of the respondents gave the following reason: tertiary students were responsible. 8.2% of the respondents gave the following reason: they did not use instructional media in teaching and learning process. 2.1% of the respondents gave the following reason: instructional media is part of technological advancement.

The conclusion was (87%) of respondents in Botswana said the reasons were: Visual instruction, skills, improved learning, interest, organized, easy to use, active participation, better results and helped in communicating, learning became more interesting, students gain appropriate skills. This was against 10.3% of respondents who gave the following reasons that they do not use instructional media and tertiary students were responsible enough. 2.1% of the respondents gave the following reason: Advancement of technology.

## 5.0 Findings

The second objective was, **“To justify and verify, if there is a correlation between instructional media and students' academic achievement, at tertiary level of education.** This objective had two research questions (*See sections 3.1. and 3.2 for details on explanation on research questions*).

### 5.1 Research question one (1)

88.7% of respondents **agreed** to **strongly agreed** that there were some other benefits of using instructional media in the teaching and learning process compared to 4.4% of the tertiary educators who **disagreed** to **strongly disagreed**.

### 5.2 Research question two (2)

(81%) of respondents in Botswana indicated that there were some differences in conceptualization of intended learning outcomes among students taught using instructional media from those taught using the traditional ways, against 6.1% of the respondents that there were no differences in academic performance. 70.7% of the respondents said that “Students who are taught using instructional media perform better.” 18.4% of respondents had “no comment.” 7.5% of the respondents commented, “The students generally perform the same academically.” 3.4% of the respondents reported that “Students who are taught using traditional ways perform better.”

100% of the respondents agreed instructional media enhanced tertiary students’ conceptualization of intended learning outcomes, although at different percentile gain.

83.6% of respondents reported that that instructional media provided “Motivation, attentiveness, and widened the tertiary students’ scope of knowledge.” 13.4% of respondents stated, “Both instructional media and traditional media complemented each other.” 3% of respondents commented, “Traditional ways of teaching were better”.

## 6.0 Discussion

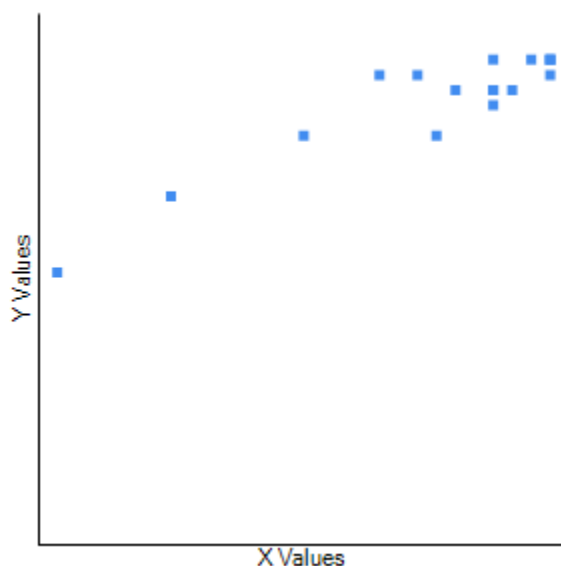
The purpose of the second objective was, “**To justify and verify, if there is a correlation between instructional media and students’ academic achievement, at tertiary level of education.** This objective sought to find out if some relationship exists between instructional media and tertiary students’ academic achievement, so as to justify and verify the correlation as seen from the educators’ point of view. This objective had two research questions (1) and (2).

Research question one (1) had the following findings: 88.7% of respondents in Botswana **agreed to strongly agreed** that there were some other benefits of using instructional media in the teaching and learning process as opposed to 4.4% of the respondents who **disagreed to strongly disagreed** that there were some other benefits of using instructional media in the teaching and learning process.

Research question two (2)’s findings indicated that: (81%) of respondents in Botswana said that: there were some differences in tertiary students’ conceptualization of intended learning outcomes among students taught using instructional media from those taught using the traditional ways, against 6.1% of the respondents who reported that there were no differences in academic performance among students taught using instructional media from those taught using the traditional ways. 70.7% of respondents in Botswana reported that instructional media enhanced tertiary students’ conceptualization of intended learning outcomes against 7.5% of the respondents who commented, “The students generally perform the same academically.” 3.4% of the respondents commented that “Students who are taught using traditional ways perform better academically.”

The valid percentages showed 100% of the respondents in Botswana agreed instructional media enhanced tertiary students’ conceptualization of intended learning outcomes, although at different percentile gains. 83.6% of respondents commented that instructional media provided “Motivation, attentiveness, and widened the tertiary students’ scope of knowledge.” 13.4% of respondents stated that, “Both instructional media and traditional media complemented each other.” And 3% of respondents, commented that, “Traditional ways of teaching were better”.

A test to check reliability of responses was done on two sampled groups of qualifications: the Diploma holders and the Masters holders. The correlation value is 0.9246, meaning that there is a strong positive correlation between the two qualifications groups. In other words, the perceptions of a diploma holder and the perceptions of a Masters holder on the role of instructional media in conceptualization of intended learning outcomes are views in the same direction and closely related. This result shows that the qualifications of respondents did not have an effect on respondents’ perceptions of the correlation between instructional media and tertiary students’ conceptualization of intended learning outcomes, making the results reliable. The coefficient of determination stands at 0, 8549, meaning 85.49% of the responses (perceptions) of respondents can be attributed to the two groups. The plotted scatter graph of the correlation between sampled diploma holders and Masters’ holders looks like this:



**Figure 4.1: Highest qualifications correlation**

**KEY: Y= Diploma. X= Masters.**

## 7.0 Conclusion

It was therefore concluded for research objective that, from the perceptions of educators, there was a strong, positive correlation between instructional media usage and tertiary students' conceptualization of intended learning outcomes in Botswana. This strong and positive correlation perception is because educators view instructional media having other benefits that assist conceptualization of intended learning outcomes in tertiary students such as; personal researches, effective teaching and learning, illustrations etc. Moreover, the perceptions were that there were some differences up to 50% more or better in tertiary students' conceptualization of intended learning outcomes when comparing students taught using instructional media, against students taught using the traditional ways of instruction.

The above evidence further supported and reinforced the strong media effect school of thought and that there is a positive correlation between instructional media and students' conceptualization of intended learning outcomes. The conclusion above is therefore, in line with the findings of Rutz, Eckart, Wade, Maltbie, Rafter and Elkins (2003), found out that instructional media influence academic achievement of students. Similar to this conclusion of this study are the findings of Peake et al (2005), who also concluded that there is a positive relationship between instructional media integration and students' academic achievement.

## 8.0 Recommendation

Management of institutions should take a lead to make instructional media a priority and key component of effective teaching and learning process at tertiary level of education in Botswana. This would enhance conceptualization of intended learning outcomes, making teaching and learning to be interesting to tertiary students in Botswana. It is further recommended that for implementation of instructional media policy in tertiary institutions, training of teaching staff is a priority on the importance and use of instructional media during teaching and learning process, this avoids the instructional media to become a white elephant. Training allows the teaching staff to be effective when preparing teaching materials and using instructional media during lesson delivery. This would enhance tertiary students' conceptualization of intended learning outcomes, since most of the tertiary educators lacked pedagogical skills

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