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Educators' Adherence to Learning Theories and Their Perceptions on the Advantages and Disadvantages of e-Learning

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***Abstract*—**Information and Communication Technologies (ICTs) are pervasive nowadays, including in education where they are expected to improve the performance of learners. However, the hope placed in ICTs to find viable solutions to the problem of poor academic performance in schools in the developing world has not yet yielded the expected benefits. This problem serves as a motivation to this study whose aim is to examine the perceptions of educators on the advantages and disadvantages of e-learning. This aim will be subdivided into two types of research objectives. Objectives on the identification and design of theories and models will be achieved using content analysis and literature review. However, the objective on the empirical testing of such theories and models will be achieved through the survey of educators from different schools in the Pinetown District of the South African Kwazulu-Natal province. SPSS is used to quantitatively analyse the data collected by the questionnaire of this survey using descriptive statistics and Pearson correlations after assessing the validity and the reliability of the data. The main hypothesis driving this study is that there is a relationship between the demographics of educators' and their adherence to learning theories on one side, and their perceptions on the advantages and disadvantages of e-learning on the other side, as argued by existing research; but this research views these learning theories under three perspectives: educators' adherence to self-regulated learning, to constructivism, and to progressivism. This hypothesis was fully confirmed by the empirical study except for the demographic factor where teachers' level of education was found to be the only demographic factor affecting the perceptions of educators on the advantages and disadvantages of e-learning.

***Keywords*—**Academic performance, e-learning, Learning theories, Teaching and Learning.

I. Introduction

INFORMATION and Communication Technologies (ICTs) are pervasive in today's society as most of the things we do involve some forms of ICTs. In homes, workplaces, schools, universities, and playgrounds, both the young and the old rely on the use of ICTs for communication, entertainment, business, service delivery, management, etc. [1]-[3]. In the context of education which is the main focus of this study, the following types of ICTs are used by education stakeholders in order to improve teaching and learning processes and outcomes: television, audiocassettes, projectors, desktop computers, laptops, tablets, mobile phones, websites, emails, audio and video conferencing, etc. [4]. However, this use of ICTs in schools is mostly present in the developed world mainly because of economic reasons; but such ICTs are also strongly needed in schools in developing countries in an attempt to strengthen education systems in these countries.

A. Problem Statement

In many developing countries primary and secondary education are compulsory [5], primary school graduates unfortunately do not always make the transition to the secondary level. In developing countries, on average, only 54% of children of the appropriate school age attend secondary education [6]. In fact, data from past national and international academic evaluations indicates that, in too many countries, children do not master basic skills, and low achievement is widespread. Countries that are mostly affected tend to be those where school systems are weak in terms of enrolment and resource availability. For example, a study by the Southern African Consortium for Monitoring Educational Quality found that more than half of sixth-graders in four out of seven countries achieve minimum competence in reading [7]. Much hope has been placed in new Information and Communication Technologies (ICTs) to find viable solutions to these problems of poor academic performance in schools, in order to offer new modes of delivery, and to transform teaching and learning processes, by exploring the excitement derived by the usage of ICTs by the youth. This problem of poor academic performance in schools despite the advances made by e-learning raises the following main research questions with its follow-up questions. These research questions will be followed by the research aims and objectives.

B. Main Research Question

What are the factors that affect the perceptions of teachers on the advantages and disadvantages of ICTs or e-learning, and which recommendations can be made to improve learners academic performance through e-learning?

Research Question 1: What are the theories that can explain the perceptions of teachers on the advantages and disadvantages of ICTs when used for teaching and learning purposes?

Research Question 2: How can the contributing factors to the perceptions of teachers on the advantages and

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disadvantages of e-learning are shaped into a hypothetical model?

Research Question 3: How can a hypothetical model on the factors affecting the perceptions of teachers on the advantages and disadvantages of e-learning are empirically validated?

Research question 4: Which teaching and learning strategies can be proposed from the knowledge of the factors affecting the perceptions of teachers on the advantages and disadvantages of e-learning?

C. Aim and Objectives.

The aim of this study is to examine the factors affecting educators' perceptions on the advantages and disadvantages of using ICTs for teaching and learning, in an attempt to contribute towards solving the above identified problem of the low performance of learners in schools, especially in the context of developing countries, despite the advances made by e-learning.

This aim is further expressed by the following listed research objectives:

a) To select suitable theories that can justify the perceptions of educators on the advantages and disadvantages of using ICTs for teaching and learning.
b) To design a conceptual model of the factors affecting the perceptions of educators on the advantages and disadvantages of e-learning.
c) To empirically test the conceptual model of the perceptions of educators on the advantages and disadvantages of e-learning.
d) To make recommendation on how to improve learners academic performance through e-learning.

II. Literature Review

Existing literature related to the objectives of this study is presented in this section using Internet search with different keywords according to each of the objectives.

A. Theories

This section gives an overview of existing literature on theories that can explain the perceptions of educators on the advantages and disadvantages of using ICTs for teaching and learning. This literature was obtained using the search keywords "e-learning theories" on Internet. A paper reviewing e-learning theories was hence found indicating that "there are really no models [or theories] of e-learning per se – only e-enhancements of models [or theories] of learning" [8]. Therefore, this study can consider that learning theories are suitable to explain the perceptions of educators on the advantages and disadvantages of e-learning. In fact, according to [9] and [10], learning theories such as behaviorism, cognitivism, constructivism, and self-regulated learning have implications on e-learning. Learning theories aim to explain how people learn, and they enable teaching professionals to remove barriers hindering learning and to improve teaching philosophies and practices. Many learning theories have been developed to explain learning processes and outcomes; but, the more popular ones are Behaviourism, Cognitivism, Constructivism, and Self-Regulated learning.

1. Behaviourism

This theory posits that a student learns from a teacher how to accomplish a given behaviour by observing, repeating, and adjusting how the teacher performs that behavior, up to the full acquisition of the given behavior. In behaviourism, learners' motivation is kept alive through incentives such as rewards and punishment. Behaviourism can serve both as a learning philosophy and as a teaching philosophy; but it is usually called Transmissivism when considered as a teaching philosophy.

2. Cognitivism

This theory considers that people learn because their inner mental activities and constructs can make them understand things. These activities involve mental practices such as problem solving, critical thinking, memorising, and knowing; which can be seen as schemas or symbolic mental constructions. Learning in this case is defined as a change in learners' schemas.

3. Constructivism

This theory is based on the premise that, by reflecting on their own experiences, culture, environment, and interests; learners construct their own understanding of the world in which they live. Constructivists believe that self-reflection and self-understanding facilitate teaching and learning. Just like behaviourism, constructivism can serve both as a learning philosophy and as a teaching philosophy; but it is usually called progressivism when considered as a teaching philosophy.

4. Self-Regulated Learning

According to [11] as cited by [10], self-regulated learning happens in three different steps. First, learners self-regulate their control of teaching and learning resources such as the guidance received from peers and faculty members, time, and the study environment. Secondly, learners self-regulate their motivation towards meeting the demands of learning. Thirdly, learners self-regulate the use of their different cognitive abilities in order to achieve the learning outcomes required by these learning demands.

B. Conceptual Models and Frameworks

The aim of this section is to identify existing models on how learning theories affect teachers' perceptions on e-learning. Unfortunately, the Internet search keywords "learning theory" + "teachers perceptions" + "models" + "e-learning" did not yield any diagram clearly showing a model of how learning theories affect teachers' perceptions on e-learning. However, this search led to the following statements on how learning theories affect teachers' perceptions on e-learning.

- "Educational technologists have often stated that an effective way to integrate technology into the teaching and learning process is to follow a constructivist model.

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Although teachers may have technical skills, they may not understand how constructivism translates into meaning classroom practice" cited by [12:91].

- "The best use for constructivism is as an agent for the integration of IT into education" [13:11].
- "In a presidential report on the use of technology in K-12 education, the authors argue that technology supports the constructivist teaching paradigm, and list uses of computers and computer networks by teachers to support constructivist learning" [14:10].
- "e-learning is learning facilitated through electronic means. It is among the group of lecturers who hold this view that the innovators and early adopters can emerge, i.e. those that will take advantage of constructivist learning to explore the affordances of e-learning to support skills and knowledge for the knowledge economy"[15:004498].
- "A great deal of research on the integration of Information and Communication Technologies (ICTs) into the classroom suggests that ICT is a pedagogical mediator that promotes constructivist classroom learning" [16:55].

This study will now attempt to present a new conceptual model linking learning theories to education stakeholders' perceptions on e-learning, as claimed above.

C. A New Conceptual Model

The theoretical model of this study hypothesizes that there is a direct relationship between the demographics of an educator, his or her adherence to certain learning theories, and his or her perceptions on the advantages and disadvantages of e-learning. A diagram for this model can be found on Fig. 1.

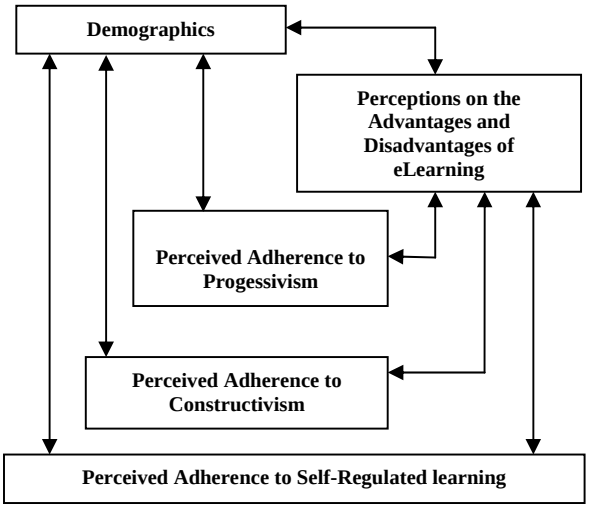


Fig. 1 A conceptual model of educators' perceptions on the advantages and disadvantages of e-learning

The model presented by Fig. 1 represents the following hypotheses to be empirically tested by the third objective of this study.

Ha0: The demographics of an educator have a direct relationship with his or her perceived adherence to self-regulated learning.

Hb0: The demographics of an educator have a direct relationship with his or her perceived adherence to progressivism.

Hc0: The demographics of an educator have a direct relationship with his or her perceived adherence to constructivism.

Hd0: The demographics of an educator have a direct relationship with his or her perceptions of the advantages and disadvantages of e-learning.

He0: The perceived adherence of an educator to self-regulated learning has a direct relationship with his or her perceptions on the advantages and disadvantages of e-learning.

Hf0: The perceived adherence of an educator to progressivism has a direct relationship with his or her perceptions on the advantages and disadvantages of e-learning.

Hg0: The perceived adherence of an educator to constructivism has a direct relationship with his or her perceptions on the advantages and disadvantages of e-learning.

The rest of this paper will now be structured according to the five constructs on the model proposed by Fig. 1 starting with the presentation of empirical studies on the effect of constructivism, progressivism, and self-regulated learning on e-learning.

D. Empirical Studies

This section will present an overview of existing empirical studies on the perceptions of educators on e-learning. The papers reviewed in this section were retrieved from Google using the search keyword "teachers' perceptions" + "e-learning". About a dozen of papers were found, mainly consisting of surveys of teachers on their perceptions on ICTs for teaching and learning, some to understand the influence of demographic factors of educators on their perceptions and others on their perceptions on the importance of ICTs in teaching and learning in relation to teaching philosophies. Countries in which these studies took place are: Sub Sahara Africa [17], Belgium [18], Malaysia [19], [22], [23], Taiwan [20], [22], [26], [29], China [21] Australia[24], [31], New Zealand [32], [25], Ethiopia [27], Singapore [28], Turkey [33], and USA [30], [10].

1. Demographics

Some papers reported that age [17]-[19], gender [20]-[22], and years of teaching experience [23], [24] do not affect educators' perceptions on e-learning. However, others found a relationship between age [25], [18], gender [25], [18], and years of teaching experience [26], [20], and educators' perceptions on e-learning.

2. Constructivism

According to [18], [21], [27]-[29], educators with strong constructivist beliefs are more interested in using ICTs for teaching.

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3. Self-Regulated Learning

According to [10], [30]-[31], self-regulated learning has a positive influence on e-learning.

4. Perceptions on the Advantages and Disadvantages of e-learning

While some studies found that ICTs are good for teaching and learning in terms of motivation, improved performance, and collaboration [25], [27], [32], [33], other findings indicate that ICTs can reduce students mental engagements, and they are costly to maintain [25], [27].

E. Research Gap

The majority of the literature reviewed in this study looks at the relationship between constructivism and e-learning; hence the choice made by this study to also look at the relationship between e-learning and other learning theories such as self-regulated learning and progressivism.

III. Research Design

The objectives of this research are approached both from a qualitative (objectives a, b, and d) and a quantitative (objective c) perspective.

1. Content Analysis*:*

This is in the form of literature review on the advantages and disadvantages of ICTs in teaching and learning

The methodology used for research objectives a, b, and d consists of the analysis of content obtained from the review of existing literature on the advantages and disadvantages of ICTs for teaching and learning.

2. Survey of Educators:

Carried out on public schools of the Pinetown district of the KwaZulu-Natal province of the Republic of South Africa.

The factors assumed to have an effect on educators' perceptions on e-learning were empirically tested through a survey of educators selected from the public schools of the Pinetown district of the KwaZulu-Natal province of the Republic of South Africa.

A. Population and Sampling

The population of this survey is therefore made up of all educators from the Pinetown district, KwaZulu-Natal, South Africa. The Pinetown district has a total population of 348 educators [34]. The sample size of this survey was calculated using the sample size calculation method proposed by [35] for finite populations:

$$n' = \frac{NZ^2P(1-P)}{d^2(N-1)+Z^2P(1-P)}$$

where Z = 1.96, P = 0.5, d = 0.048, N = 348. This gives a sample size of 65.

B. Research Variables and Data Collection

The five research variables of this survey appear on Fig. 2: Educators' demographics, their perceived adherence to self-regulated learning, their perceived adherence to constructivism, their perceived adherence to progressivism, and their perceptions on the advantages and disadvantages of e-learning. Perceived adherence to self-regulated learning was measured using an adaptation of the scale proposed by [36], the perceived adherence to constructivism and to progressivism were measured using an adaptation of the scale proposed by [37]; and the perceptions on the advantages and disadvantages of e-learning were measured using an original scale proposed by this study using different sources [25], [27], [32], and [33].

IV. Results

It is now time to present the results of the survey conducted by this study on the factors possibly affecting the perceptions of educators on the advantages and disadvantages of e-learning, starting with a few words on the reliability and validity of the data collected by the survey.

A. Data Validity and Reliability

Table I shows that the data collected by this survey is reliable judging by the fact that all the Likert scale variables have a Cronbach's alpha (α) coefficient greater than 0.8.

TABLE I
Reliability Table for Research Variables

Research Variable	No of items	Cronbach's Alpha (a)
Perceived Self-Regulation	10	0.894
Perceived Progressivism	10	0.937
Perceived Constructivism	10	0.932
Perception the Advantages and Disadvantages of e-learning	10	0.924

B. Descriptive Statistics

This section will present descriptive statistics on the demographics of the surveyed teachers as well as their perceptions on the advantages and disadvantages e-learning, their adherence to Self-Regulated learning, to Constructivism, and to Progressivism.

1. Demographics

Descriptive statistics on the demographics of the educators (see Table II) who participated in this study indicate that the overwhelming majority of these educators are female whose ages are evenly spread among the different groups. It is interesting to note that the size (between 21 and 40) of most classes is manageable, and most educators are suitably qualified either in languages or in Mathematics. It is also interesting to note that almost the entire sample of educators is made up of Africans, almost half of the educators frequently use computers, and a two third of the educators teach in primary grades (See Table II).

2. Perceived Adherence to Self-Regulated Learning

According to Table III, almost two thirds of the educators who participated in this study weakly, fairly or strongly agree that they adhere to self -regulated learning, against one third of the educator who strongly or fairly disagree that they adhere to self-regulated learning. However the opinions of educators are

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equally divided as to whether students are able to reach their goals without external help (See Table III).

3. Perceived Adherence to Constructivism

According to Table IV, the overwhelming majority of the educators who participated in this study indicated that they perceive themselves as constructivist (See Table IV).

4. Perceived Adherence to Progressivism

According to Table V, **t**he overwhelming majority of the educators who participated in this study indicated that they perceive themselves as progressive (See Table V).

TABLE II
DEMOGRAPHICS OF EDUCATORS

A		Per (%)
A1	Male	9.2
	Female	90.8
A2	Urban	60
	Rural	40
A3	Less 30	20
	30-40	21.5
	41-50	36.9
	Above 50	21.5
A4	Grade R-3	33.8
	Grade 4-6	30.8
	Grade 7-9	12.3
	Grade 10-12	13.8
	Grade 4-6 Grade 7-9	6.2
	Grade 7-9 Grade 10-12	3.1
A5	1-20	4.6
	21-40	58.4
	41-60	23.1
	Above 61	13.8
A6	Diploma	41.5
	Bachelors	33.8
	Honors	24.6
A7	L	50.8
	M	9.2
	S&T	4.3
	SS	6.2
	L,M	9.2
	L,S&T	1.5
	L,SS	3.1
	M,S&T	6.2
	S&T,SS	4.6
	L,M,S&T	3.1
	L,M,S&T,SS	1.5
A8	None	58.4
	Daily	10.8
	Weekly	20
	Monthly	10.8
A9	African	90.7
	Indian	6.1
	White	1.5
	Others	1.5
A10	0-5Years	23
	6-10Years	18.5
	11-15Years	13.4
	16-20Years	18.9
	Above 20Years	26

TABLE III
PERCEIVED ADHERENCE TO SELF-REGULATION

B	S1	S2	S3	S4	S5	Mean	SD
B1	22	20	14	25	20	3.02	1.463
B2	17	25	11	32	15	3.05	1.374
B3	25	25	23	15	12	2.66	1.338
B4	9	22	25	22	23	3.28	1.293
B5	17	28	18	17	20	2.95	1.397
B6	12	11	20	31	26	3.48	1.324
B7	18	20	23	25	14	2.95	1.328
B8	6	9	17	42	26	3.72	1.139
B9	5	20	29	29	29	3.34	1.122
B10	6	11	22	26	35	3.74	1.128
Average	13.7	19.1	20.2	26.4	20.8		

TABLE IV
PERCEIVED ADHERENCE TO CONSTRUCTIVISM

C	S1	S2	S3	S4	S5	Mean	SD
C1	8	11	22	28	32	3.66	1.253
C2	5	14	28	25	29	3.60	1.183
C3	11	3	17	40	29	3.74	1.228
C4	8	8	15	25	45	3.91	1.271
C5	9	8	22	23	38	3.74	1.302
C6	9	11	22	28	31	3.60	1.285
C7	6	12	14	29	37	3.85	1.302
C8	6	11	18	29	35	3.77	1.222
C9	3	14	18	34	31	3.75	1.132
C10	3	9	18	32	37	3.91	1.100
Average	6.8	10.1	19.4	29.3	34.4		

TABLE V
PERCEIVED ADHERENCE TO PROGRESSIVISM

D	S1	S2	S3	S4	S5	Mean	SD
D1	6	6	9	25	54	4.14	1.197
D2	3	2	5	40	51	4.34	.889
D3	3	2	8	25	62	4.55	.867
D4	3	3	8	25	62	4.38	.979
D5	5	2	9	28	57	4.31	1.030
D6	3	5	6	15	71	4.46	1.017
D7	5	3	5	20	68	4.43	1.045
D8	5	3	3	26	63	4.40	1.028
D9	5	3	2	22	69	4.48	1.017
D10	2	3	5	15	75	4.60	.844
Average	4	3.2	5.4	24.1	63.9		

5. Perceptions on the Advantages and Disadvantages of e-learning

According to Table VI, **t**he overwhelming majority of educators who participated in this study indicated that ICT based teaching and learning is more advantageous than traditional teaching and learning (See Table VI).

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TABLE VI
PERCEPTIONS ON ADVANTAGES AND DISADVANTAGES OF E-LEARNING

E	S1	S2	S3	S4	S5	Mean	SD
E1	2	9	6	31	52	4.23	1.027
E2	5	0	3	18	74	4.57	.935
E3	6	3	5	28	58	4.29	1.114
E4	5	6	11	35	43	4.06	1.102
E5	3	2	3	25	68	4.52	.886
E6	5	3	8	28	57	4.29	1.057
E7	6	8	8	20	58	4.17	1.232
E8	14	0	6	29	51	4.03	1.357
E9	12	3	8	32	45	3.94	1.333
E10	11	8	8	18	55	4.00	1.392
Average	6.9	4.2	6.6	26.4	56.1		

C. Correlations

The results from Tables VII and VIII are summarized by Fig. 2. The interpretation of Fig. 2 combined with the initial hypotheses of this study leads to the following results.

TABLE VII
CORRELATIONS OF DEMOGRAPHICS AND OTHER VARIABLES

		B	C	D	E
A1	Pearson Correlation	-.189	-.103	-.194	-.092
	Sig. (2-tailed)	.132	.415	.121	.464
	N	65	65	65	65
A2	Pearson Correlation	.170	.178	-.074	-.006
	Sig. (2-tailed)	.175	.155	.557	.960
	N	65	65	65	65
A3	Pearson Correlation	.046	-.062	-.125	-.162
	Sig. (2-tailed)	.715	.626	.320	.198
	N	65	65	65	65
A4	Pearson Correlation	-.091	-.240	-.165	-.168
	Sig. (2-tailed)	.469	.054	.189	.181
	N	65	65	65	65
A5	Pearson Correlation	-.067	-.068	-.097	-.087
	Sig. (2-tailed)	.598	.593	.440	.491
	N	65	65	65	65
A6	Pearson Correlation	-.250*	-.195	.092	-.151
	Sig. (2-tailed)	.044	.120	.467	.231
	N	65	65	65	65
A7	Pearson Correlation	.080	.067	.084	.079
	Sig. (2-tailed)	.525	.597	.504	.529
	N	65	65	65	65
A8	Pearson Correlation	-.050	-.002	.132	.055
	Sig. (2-tailed)	.691	.989	.293	.666
	N	65	65	65	65
A9	Pearson Correlation	.002	-.056	-.355**	-.275*
	Sig. (2-tailed)	.984	.660	.004	.026
	N	65	65	65	65
A10	Pearson Correlation	-.021	-.104	-.179	-.221
	Sig. (2-tailed)	.866	.409	.153	.077
	N	65	65	65	65

**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

TABLE VIII
CORRELATION NOT INVOLVING DEMOGRAPHICS

		B	C	D	E
B	Pearson Correlation	1	.746**	.272*	.195
	Sig. (2-tailed)		.000	.029	.120
	N	65	65	65	65
C	Pearson Correlation	.746**	1	.450**	.333**
	Sig. (2-tailed)	.000		.000	.007
	N	65	65	65	65
D	Pearson Correlation	.272*	.450**	1	.628**
	Sig. (2-tailed)	.029	.000		.000
	N	65	65	65	65
E	Pearson Correlation	.195	.333**	.628**	1
	Sig. (2-tailed)	.120	.007	.000	
	N	65	65	65	65

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

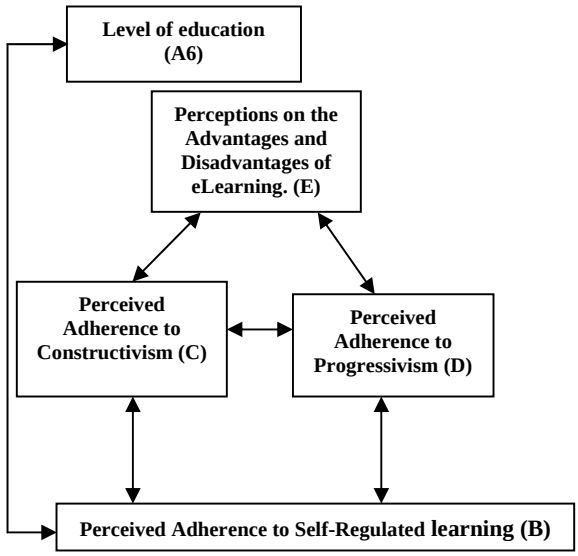


Fig. 2 Model of Educators' perception of advantages and disadvantages of e-learning

Ra. The level of education of an educator has a direct relationship with his or her perceived adherence to self-regulated learning.
Rb. The level of education of an educator does not have a direct relationship with his or her perceived adherence to progressivism.
Rc. The level of education of an educator does not have a direct relationship with his or her perceived adherence to constructivism.
Rd. The level of education of an educator does not have a direct relationship with his or her perceptions of the advantages and disadvantages of e-learning.
Re. The perceived adherence of an educator to self-regulated learning does not have a direct relationship with his or her perceptions on the advantages and disadvantages of e-learning.
Rf. The perceived adherence of an educator to progressivism

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has a direct relationship with his or her perceptions on the advantages and disadvantages of e-learning.

Rg. The perceived adherence of an educator to constructivism has a direct relationship with his or her perceptions of the advantages and disadvantages of e-learning.

V. Discussion and Conclusion

The following points truly reflect the essence of this paper on the perceptions of teachers on the advantages and disadvantages of e-learning.

a) According to the literature reviewed in this study [6]-[16], learning theories are able to explain the perceptions of educators on the advantages and disadvantages of e-learning.

b) According to the literature reviewed in this study, one can hypothesize a model linking educators' demographics and their perceptions on the advantages and disadvantages of e-learning, with the following constructs from the learning theories: educators' perceived adherence to self-regulated learning, their perceived adherence to constructivism, and their perceived adherence to progressivism.

c) According to the results of the survey conducted by this study, the perceptions of educators on the advantages and disadvantages of e-learning are not affected by their demographics but by their perceived adherence to constructivism and to progressivism. However, their level of education affects their perceived adherence to self-regulation. It is interesting to note that all of the learning theories constructs used in this study affect one another.

d) One of the interesting findings of the survey conducted by this study is that educators do not agree that learners are able to take critical decisions. Therefore, more research should be done on that aspect in order to improve learners' self-regulated learning.

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