OUM Seminar

Learning Outcomes in ODL: A Study of Learners' Experience

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Presentation Outline

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Introduction

- On 16 March 2016, a Google Scholar search on "online education" has yielded 3.38 million hits indicating vast potential of online education.

- Although there is an abundance of research available on online education, very little of it centres on the academic impact and learning effects of this modality on students (Jahng, 2007; Kirtman, 2009; Tallent-Runnels et al., 2006).

- There is a need for research to improve our understanding of the elements which affect learners' learning outcomes.

Introduction

- What is learning outcome?

    The National Institute for Learning Outcomes Assessment (2012) defines learning outcomes as "the expected knowledge, skills, attitudes, competencies, and habits of mind that students are expected to acquire at an institution of higher education."

- The overall goal of education is learning; therefore, learning effectiveness must be the primary factor for which quality in education is measured or judged.

Introduction

- A study of this nature is important as it exposes the fundamental issues of the ODL delivery method from the perspectives of OUM's blended and online learning programmes.

- Using advanced statistical analysis via **Structural Equation Modeling** a deterministic approach can be undertaken to determine factors and mediators which ascertain learner outcomes.

- Findings can then be used by decision-makers to leverage further on the delivery approach and student learning for instructional improvement.

Introduction

- Research Questions
    - To what extent do socio-demographic indicators affect OUM's learning outcomes?;
    - What are the factors which explain the effectiveness of OUM's learning outcomes?; and
    - How do these factors mediate learning outcomes in OUM's academic programmes?

Review of Literature

- Learning outcomes have their roots on learning theories. Of relevance is the **social constructivist theory** by Vygotsky.

- Theory is related to **constructivism**, an important aspect of technology-based mediation of learning.

- **Social constructivism** maintains that human acquisition of knowledge and skills are socially situated and can be "constructed" through interaction with others.

- Groups construct knowledge for one another, collaboratively creating a shared culture.

- Discussion and interactive discourse within this "culture" promote learning because learners can interact with peers and facilitators within a learning platform, for e.g. through OUM's MyVLE.

Review of Literature

- As with OUM's approach to teaching and learning, we can also incorporate connectivism into its paradigm.

- McHaney (2011) and Siemens (2004) introduced the concept of connectivism, which conceptualises learning as a shared, community experience which is facilitated by technology.

  – Connectivism suggests that whereas the other learning theories assume that learning occurs within the individual, learning can also occur outside the individual and be stored and organised by technology. This learning theory suggests that due to the vast capability of technology to store and redeploy knowledge, what becomes a more important component of learning is how to find and access the information already available.

Literature Review

- Research shows that students who are characterised as the most successful in an online learning environment tend to be motivated, independent, and organised (Phipps & Merisotis, 1999) and have good self-regulation strategies (McMahon & Oliver, 2001).

- McMahon & Oliver (2001) claimed that students in an online environment must accept a greater responsibility for their own learning since they have limited access to instructional support.

- As Hannafin et al. (2003) indicates, attitudes toward web-based instruction impact students' abilities to learn in that media, so student data concerning distance learning is needed.

  - Based on their particular academic background, students who routinely use computers are better able to learn via computer lessons.

Literature Review

- Shelton & Saltsman (2005) found the most common complaints from faculty members regarding online education are a lack of understanding for this method of teaching, a lack of institutional support, and fear that the quality of education in the online environment suffers.

- Research has found that online courses that utilise tools to augment interaction (student-to-student and student–to-instructor) and engagement further enhance learning outcomes and overall satisfaction (McFarland & Hamilton, 2005; Palmer & Holt, 2008).

- Research consistently shows that engagement and interaction in the online classroom leads to student learning outcomes, and a quality online learning experience (McFarland & Hamilton, 2005; Dykman & Davis, 2008; Palmer & Holt, 2008).

Methodology

- Survey was undertaken by IQRI/CRI in 2015 to study some aspects of learning outcomes in OUM's e-learning programmes.

- Survey research design used via the administration of a web-based questionnaire.

- Survey instrument comprises demographic information, rating scale items (5-point Likert scale), and open-ended questions.

- Sample comprising 397 learners from different faculties from OUM's Learning Centres.

Methodology

- 1. All rating scale variables comprising 24 items were factor-analysed using the **Principal Component Method** to determine salient factors. 3 factors were extracted.

- 2. The items nested within the 3 factors were then summed up to obtain the composite mean scores of individual responses.

- 3. Reliability tests were undertaken to test the **internal consistency** of items which made up the 3 factors.

- 4. SEM was used to construct the path diagram consisting of observed variables and latent constructs. This is checked for overall fit using Goodness-of-Fit statistics.

- 5. The significant predictors and highly correlated variables were then used to construct the mediation framework derived from the path diagram.

- 6. Inferences and conclusions were made from the empirical evidence derived from Step 1 to Step 5 above.

Methodology

- Very high reliability (Cronbach alpha) values were seen in the 3 constructs indicating high internal consistency:

Constructs	Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
Teaching & Learning Materials	.944	.945	13
e-Tutoring	.964	.965	6
Learning Experience	.882	.879	5

Findings

- Learners' perceptions of teaching and learning materials are highest (mean = 3.69; S.D. = .616), followed by role of e-tutors (mean = 3.60; S.D. = .871) and learning experience (mean = 3.24; S.D. = .787).

What is your gender?		Teaching and materials	Role of the e-Tutor	Learning Experience
Female	Mean	3.7092	3.6393	3.2547
	N	286	286	286
	Std. Deviation	.56345	.80684	.75395
Male	Mean	3.6386	3.4922	3.2050
	N	111	111	111
	Std. Deviation	.73536	1.01351	.86914
Total	Mean	3.6895	3.5982	3.2408
	N	397	397	397
	Std. Deviation	.61620	.87076	.78705

Findings

- Female learners perceived teaching and learning materials, e-tutoring and learning experiences better than male students

	What is your gender?	N	Mean	Std. Deviation	Std. Error Mean
Teaching and materials	Female	286	3.7092	.56345	.03332
	Male	111	3.6386	.73536	.06980
e-Tutoring	Female	286	3.6393	.80684	.04771
	Male	111	3.4922	1.01351	.09620
Learning Experience	Female	286	3.2547	.75395	.04458
	Male	111	3.2050	.86914	.08250

Findings

- Using t-test for independent samples, the differences in male and female perceptions are not significant in all the 3 constructs (p > .05)

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Teaching and materials	Equal variances not assumed	7.133	.008	.914	162.582	.362	.07065	.07734
e-Tutoring	Equal variances not assumed	6.790	.010	1.370	166.870	.173	.14707	.10738
Learning Experience	Equal variances assumed	2.429	.120	.563	395	.573	.04963	.08809

Findings

- There is a tendency that the older the learners, the more positive their perceptions of teaching and learning materials, e-tutoring and learning experience.

		N	Mean	Std. Deviation	Std. Error
Teaching and materials	18 to 24	76	3.7270	.52191	.05987
	25 to 34	177	3.6262	.68849	.05175
	35 to 44	106	3.7150	.60812	.05907
	45 to 54	30	3.8710	.39035	.07127
	55 to 64	8	3.7160	.44335	.15675
	Total	397	3.6895	.61620	.03093
e-Tutoring	18 to 24	76	3.5848	.83727	.09604
	25 to 34	177	3.5420	.92442	.06948
	35 to 44	106	3.6602	.84858	.08242
	45 to 54	30	3.7889	.76180	.13908
	55 to 64	8	3.4317	.60256	.21304
	Total	397	3.5982	.87076	.04370
Learning Experience	18 to 24	76	3.2069	.78125	.08962
	25 to 34	177	3.2133	.82915	.06232
	35 to 44	106	3.3169	.77788	.07555
	45 to 54	30	3.2570	.61439	.11217
	55 to 64	8	3.1000	.65900	.23299
	Total	397	3.2408	.78705	.03950

Findings

- No significant differences exist between age groups (p > .05).

ANOVA		Sum of Squares	df	Mean Square	F	Sig.
Teaching and materials	Between Groups	1.879	4	.470	1.240	.293
	Within Groups	148.482	392	.379		
	Total	150.362	396			
Role of the e-Tutor	Between Groups	2.294	4	.573	.754	.556
	Within Groups	297.961	392	.760		
	Total	300.254	396			
Learning Experience	Between Groups	1.002	4	.250	.402	.807
	Within Groups	244.297	392	.623		
	Total	245.299	396			

Findings

- Ratings for those with or without previous experience in online course were relatively high.

Group Statistics					
	Have you taken a FULLY ONLINE course before?	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
Teaching and materials	Yes	214	3.6728	.56549	.03866
	No	183	3.7090	.67172	.04966
e-Tutoring	Yes	214	3.5863	.84655	.05787
	No	183	3.6121	.90038	.06656
Learning Experience	Yes	214	3.2245	.81961	.05603
	No	183	3.2598	.74896	.05536

Findings

- There is no significant difference (p > .05) whether learners come in with or without previous experience in online course based on their ratings of : i. teaching and learning materials, ii. e-tutoring, and iii. learning experience

Independent Samples Test		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Teaching and materials	Equal variances assumed	.466	.495	-.582	395	.561	-.03613	.06209
	Equal variances not assumed			-.574	357.310	.566	-.03613	.06293
e-Tutoring	Equal variances assumed	.025	.873	-.294	395	.769	-.02576	.08777
	Equal variances not assumed			-.292	377.058	.770	-.02576	.08820
Learning Experience	Equal variances assumed	3.956	.047	-.445	395	.656	-.03533	.07932
	Equal variances not assumed			-.448	393.246	.654	-.03533	.07877

Findings

- There is a tendency for those who spent more time online to rate relatively higher.

		N	Mean	Std. Deviation	Std. Error
Teaching and materials	Less than 30 minutes	104	3.4670	.70085	.06872
	30 to 60 minutes	183	3.7408	.52627	.03890
	1 to 2 hours	69	3.8285	.58655	.07061
	2 to 4 hours	25	3.8714	.62613	.12523
	More than 4 hours	16	3.6648	.76400	.19100
	Total	397	3.6895	.61620	.03093
e-Tutoring	Less than 30 minutes	104	3.2674	1.01129	.09917
	30 to 60 minutes	183	3.6664	.79460	.05874
	1 to 2 hours	69	3.8269	.65634	.07901
	2 to 4 hours	25	3.8200	.83322	.16664
	More than 4 hours	16	3.6354	1.06322	.26581
	Total	397	3.5982	.87076	.04370
Learning Experience	Less than 30 minutes	104	3.0319	.82609	.08100
	30 to 60 minutes	183	3.2364	.70718	.05228
	1 to 2 hours	69	3.5121	.69855	.08410
	2 to 4 hours	25	3.4335	.99178	.19836
	More than 4 hours	16	3.1774	1.05158	.26289
	Total	397	3.2408	.78705	.03950

Findings

- There is a significant difference in the time learners spent in logging-in to the online sessions with their ratings associated with i. teaching and learning materials ii. e-tutoring and iii. learning experience

ANOVA		Sum of Squares	df	Mean Square	F	Sig.
Teaching and materials	Between Groups	7.803	4	1.951	5.364	.000
	Within Groups	142.558	392	.364		
	Total	150.362	396			
Role of the e-Tutor	Between Groups	17.090	4	4.272	5.915	.000
	Within Groups	283.165	392	.722		
	Total	300.254	396			
Learning Experience	Between Groups	10.614	4	2.653	4.432	.002
	Within Groups	234.686	392	.599		
	Total	245.299	396			

Findings

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- Significant differences exist between time spent online and their ratings in Teaching and Learning materials for specific groups .

(I) When I log on the fully online course, my fully online sessions averages...	(J) When I log on the fully online course, my fully online sessions averages...	Mean Difference (I-J)	Std. Error	Sig.
Less than 30 minutes	30 to 60 minutes	-.27387*	.07405	.002
	1 to 2 hours	-.36154*	.09363	.001
	2 to 4 hours	-.40448*	.13433	.023
	More than 4 hours	-.19787	.16194	.739
30 to 60 minutes	Less than 30 minutes	.27387*	.07405	.002
	1 to 2 hours	-.08766	.08519	.842
	2 to 4 hours	-.13061	.12858	.848
	More than 4 hours	.07601	.15722	.989
1 to 2 hours	Less than 30 minutes	.36154*	.09363	.001
	30 to 60 minutes	.08766	.08519	.842
	2 to 4 hours	-.04295	.14077	.998
	More than 4 hours	.16367	.16733	.865
2 to 4 hours	Less than 30 minutes	.40448*	.13433	.023
	30 to 60 minutes	.13061	.12858	.848
	1 to 2 hours	.04295	.14077	.998
	More than 4 hours	.20662	.19307	.822
More than 4 hours	Less than 30 minutes	.19787	.16194	.739
	30 to 60 minutes	-.07601	.15722	.989
	1 to 2 hours	-.16367	.16733	.865
	2 to 4 hours	-.20662	.19307	.822

Findings

- Significant differences exist between time spent online and their ratings in e-tutoring for specific groups.

(I) When I log on the fully online course, my fully online sessions averages...	(J) When I log on the fully online course, my fully online sessions averages...	Mean Difference (I-J)	Std. Error	Sig.
Less than 30 minutes	30 to 60 minutes	-.39895*	.10437	.001
	1 to 2 hours	-.55945*	.13196	.000
	2 to 4 hours	-.55259*	.18931	.030
	More than 4 hours	-.36800	.22824	.490
30 to 60 minutes	Less than 30 minutes	.39895*	.10437	.001
	1 to 2 hours	-.16050	.12007	.668
	2 to 4 hours	-.15364	.18122	.915
	More than 4 hours	.03094	.22157	1.000
1 to 2 hours	Less than 30 minutes	.55945*	.13196	.000
	30 to 60 minutes	.16050	.12007	.668
	2 to 4 hours	.00686	.19840	1.000
	More than 4 hours	.19144	.23583	.927
2 to 4 hours	Less than 30 minutes	.55259*	.18931	.030
	30 to 60 minutes	.15364	.18122	.915
	1 to 2 hours	-.00686	.19840	1.000
	More than 4 hours	.18458	.27211	.961
More than 4 hours	Less than 30 minutes	.36800	.22824	.490
	30 to 60 minutes	-.03094	.22157	1.000
	1 to 2 hours	-.19144	.23583	.927
	2 to 4 hours	-.18458	.27211	.961

Findings

- Significant differences exist between time spent online and learners' ratings on learning experience for specific groups.

(I) When I log on the fully online course, my fully online sessions averages...	(J) When I log on the fully online course, my fully online sessions averages...	Mean Difference (I-J)	Std. Error	Sig.
Less than 30 minutes	30 to 60 minutes	-.20450	.09502	.200
	1 to 2 hours	-.48020*	.12014	.001
	2 to 4 hours	-.40165	.17235	.137
	More than 4 hours	-.14551	.20779	.956
30 to 60 minutes	Less than 30 minutes	.20450	.09502	.200
	1 to 2 hours	-.27570	.10931	.088
	2 to 4 hours	-.19714	.16498	.754
	More than 4 hours	.05899	.20172	.998
1 to 2 hours	Less than 30 minutes	.48020*	.12014	.001
	30 to 60 minutes	.27570	.10931	.088
	2 to 4 hours	.07855	.18062	.993
	More than 4 hours	.33469	.21470	.525
2 to 4 hours	Less than 30 minutes	.40165	.17235	.137
	30 to 60 minutes	.19714	.16498	.754
	1 to 2 hours	-.07855	.18062	.993
	More than 4 hours	.25614	.24772	.839
More than 4 hours	Less than 30 minutes	.14551	.20779	.956
	30 to 60 minutes	-.05899	.20172	.998
	1 to 2 hours	-.33469	.21470	.525
	2 to 4 hours	-.25614	.24772	.839

Findings : Factors affecting Learners' Outcomes

Method
- Factor analysis using IBM SPSS Statistics
- Principal Component Method

Bartlett's test of sphericity
- Presence of correlations indicating appropriateness
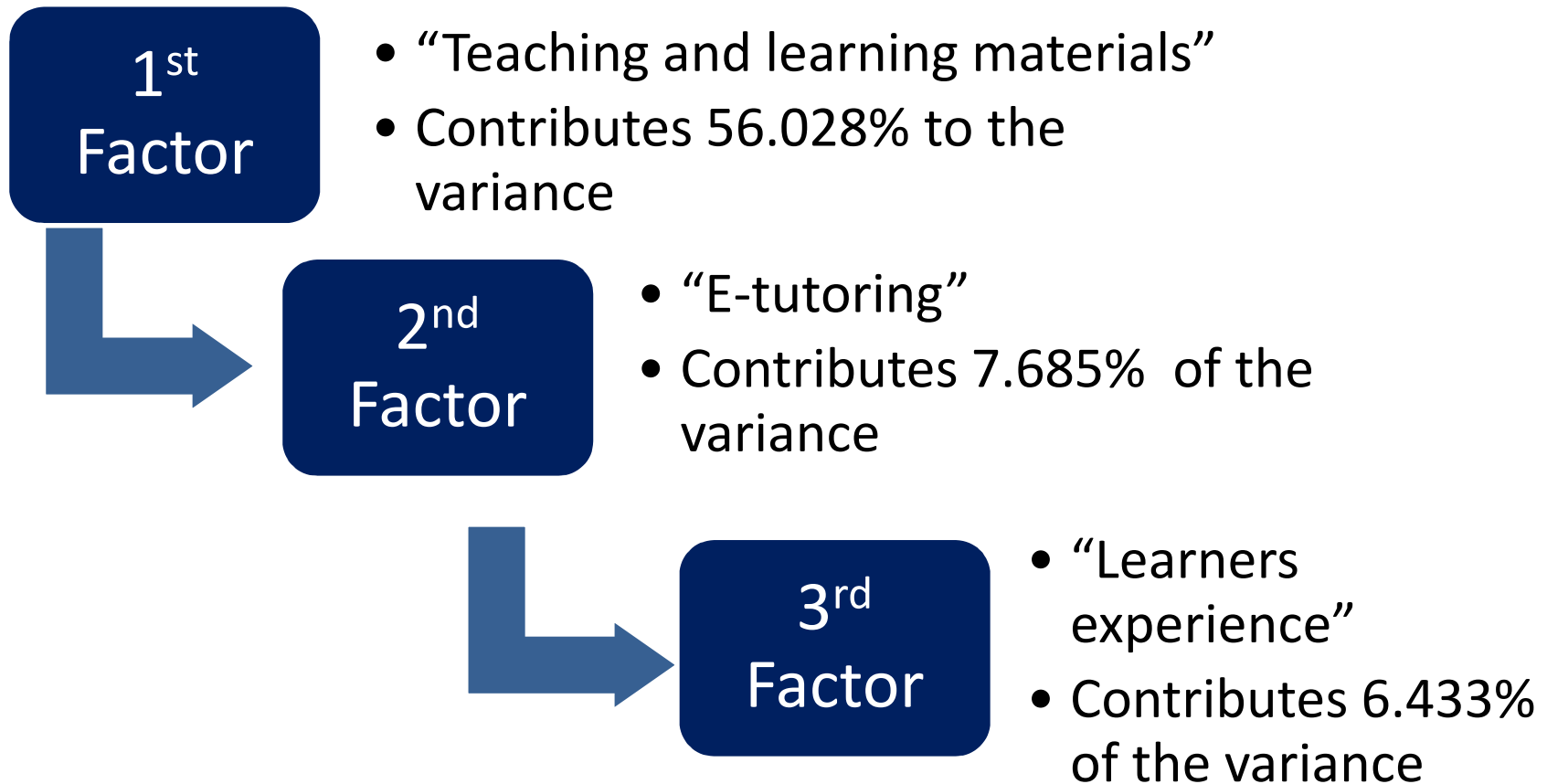- A significance level of less than .05 (chi-sq=6471.362; df=276; p<.001)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy (MSA)
- Determines sampling adequacy
- Value is very high, i.e. .954 – Meritorious (Hair, et al. (2010)

Findings : Factors affecting Learners' Outcomes

Key Success Factors

1st Factor
- "Teaching and learning materials"
- Contributes 56.028% to the variance

2nd Factor
- "E-tutoring"
- Contributes 7.685% of the variance

3rd Factor
- "Learners experience"
- Contributes 6.433% of the variance

Factor Determination based on Percentage of Variance Method

Structural Equation Modeling (using AMOS)

- Confirmatory analysis of key factors which influence learning outcomes.

- Analysis would be a deterministic approach for decision-making.

- A holistic view of the over-riding mechanism which leverages on building observed variables to be tested against latent constructs in a structural and measurement model.
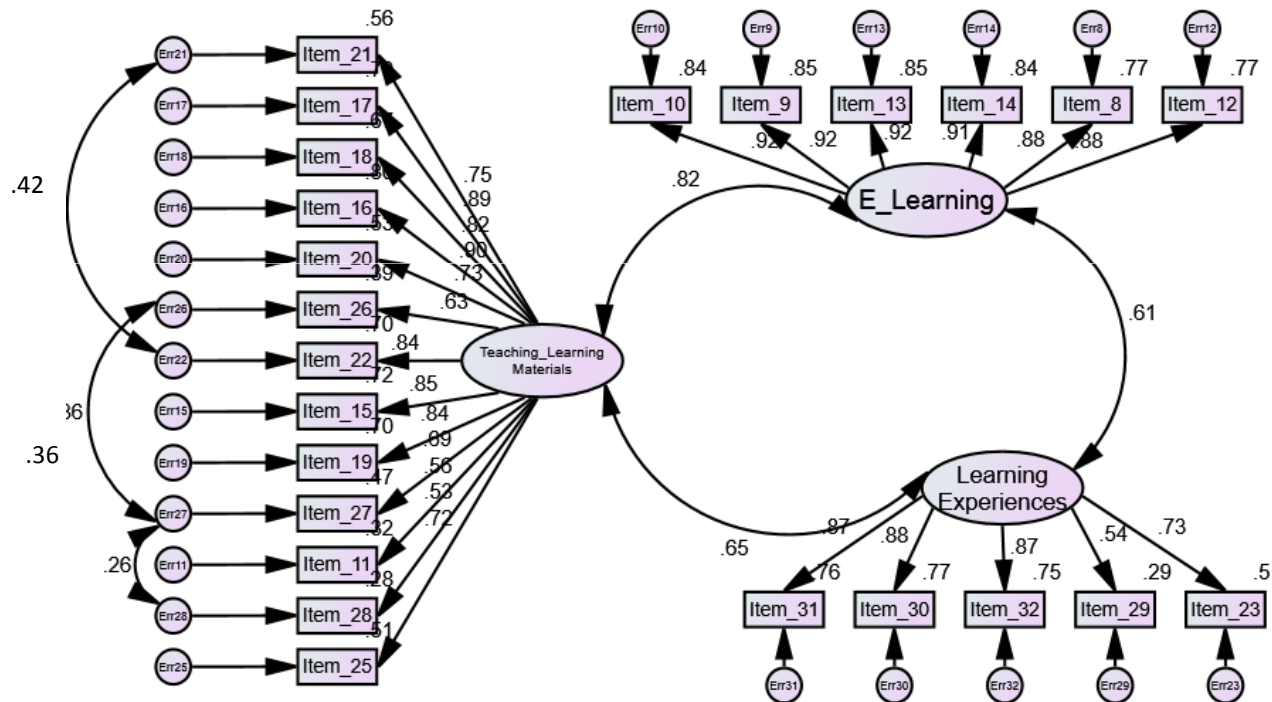
Findings: Confirmatory Specifications showing Goodness-of-Fit

- Goodness of Fit Indices (GFI)

Model	RMR	GFI	AGFI	PGFI
Default model	.065	.820	.781	.672
Saturated model	.000	1.000		
Independence model	.405	.123	.047	.113

- Baseline Comparison: Comparative Fit Indices

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.887	.874	.912	.900	.911
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Findings: Confirmatory Specifications

- RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.091	.085	.096	.000
Independence model	.287	.282	.292	.000

Findings: Mediation

- Does e-tutoring in OUM mediate against Learning Experience?

- Do OUM's teaching and learning materials have a bearing on Learning Experience of learners?

Answer: Yes. This mediation is partial.
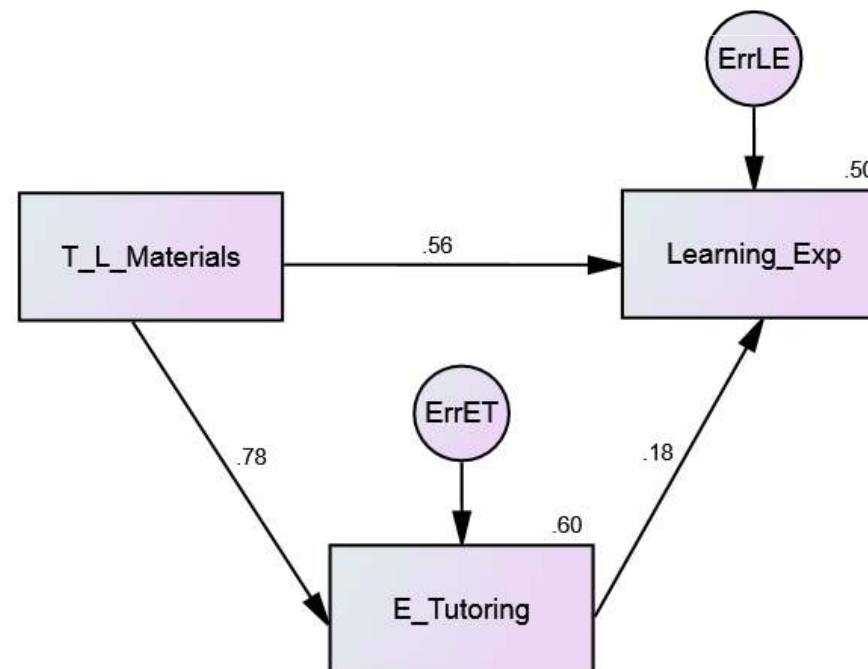
Findings: Mediation & Prediction

- Which variables predict OUM's ODL outcomes?

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.708[a]	.502	.500	.55266	.502	341.189	1	339	.000
2	.714[b]	.509	.506	.54926	.008	5.211	1	338	.023

a. Predictors: (Constant), T_L_Materials

b. Predictors: (Constant), T_L_Materials, E_Tutoring

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	104.211	1	104.211	341.189	.000[b]
	Residual	103.543	339	.305		
	Total	207.754	340			
2	Regression	105.783	2	52.892	175.319	.000[c]
	Residual	101.971	338	.302		
	Total	207.754	340			

a. Dependent Variable: Learning_Exp

b. Predictors: (Constant), T_L_Materials

c. Predictors: (Constant), T_L_Materials, E_Tutoring

Findings: Mediation

- SEM analysis proves the presence of **partial mediation** in students' learning experience.

- The path regression weights (standardised beta coefficients) show that OUM's teaching and learning meterials have a bearing on learners' learning experience. T&L materials contribute 50.2% to the variation of Learning Experience.

- When T&L materials are included with e-tutoring, the contribute of T&L materials and e-tutoring made up 50.9% to the learning experience. Hence of the 2, T&L contributes much more than e-tutoring itself.

- Age, Gender, CGPA, Time online, whether a learner had experience in online learning or not do not significantly predict Learner Experience in OUM's programmes.

Conclusions

- SEM analysis confirms factor analysis extraction of factors.

- The hypothesised model fits well with data structure.

- Since data shows a generally successful implementation of ODL outcomes it can therefore be concluded that OUM's ODL teaching and learning resources, e-tutoring system and learning experiences have resulted in effective and significant outcomes of the desired delivery system – from learners' perspectives.

Thank You
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