

# EVALUATION OF AN INTERACTIVE E-BOOK AS AN EFFECTIVE RESOURCE FOR STUDENT ENGAGEMENT AND LEARNING IN ANATOMY.

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## BACKGROUND

Use of E-books (or electronic textbooks) is increasing in tertiary education, and are starting to replace conventional paper textbooks. E-textbooks have several advantages over conventional paper textbooks, including portability and being able to incorporate interactive mediums (sound and videos). Additionally, if academics develop their own E-books, they can only include material that is very specific for their subject, have links to relevant websites, and include practice tests (Alkadi & Johnson 2009). However, it is very time consuming for academics to generate their own e-books, and there is limited evidence on the effectiveness of using E-books as a teaching resource in tertiary education. Thus, it comes as no surprise that current literature shows little uptake of e-books in tertiary education (Chong 2008). Empirical data is needed to demonstrate the effectiveness of E-Books in tertiary education.

## AIMS

To determine if using an E-book providing resources for 5 Embryology systems improves student engagement and learning in Anatomy - a challenging and under-resourced subject.

## DESCRIPTION OF INTERVENTION

James Cook University (JCU) health students were given access to either a textbook OR an E-book and textbook on Embryology that covered 5 systems: cardiovascular, respiratory, digestive, urinary and reproductive.

## DESIGN AND METHODS

In 2017, weekly 3-hour Anatomy practical classes on each of the 5 Embryology systems, a non-randomized, cross-over trial design compared JCU Biomedical Sciences & Medical student (n=85) learning when using the textbook resource only to their learning when using both E-book AND textbook resources.

The practical class was split into 2 groups. For the first 20 minutes, each group used either just the textbook OR the E-book + textbook resources to study a component of the embryology teaching for that week, then completed a 5-minute survey on their learning experience. Students then 'crossed over' and swapped resources with the other group, and similar to the first 20 minute session, they continued to study the embryology teaching materials for 20 minutes using the available resources, then filled out an identical 5-minute survey.

Survey data was entered into SPSS version 22, and analyzed using 2-sided paired T-tests.

## RESULTS

Male students found using both the E-book and textbook resources significantly enhanced the quality of their learning experiences ( $p < 0.001$ ), their level of engagement with the resources ( $p < 0.001$ ) and their overall enjoyment of learning the Embryology systems ( $p < 0.001$ ), compared to when they just used the textbook resource. Female students found using both the E-book and textbook resources significantly enhanced the quality of their learning experiences ( $p < 0.004$ ), and their overall enjoyment of learning the Embryology systems ( $p = 0.024$ ), compared to when they just used the textbook. Findings are summarized in the Table below.

Table: James Cook University health student perceptions (a total of 179 female and 118 male students over the 5 weeks) of the learning environment across 4 weeks of system Embryology when using 'textbook only' or 'E-book AND textbook' resources, as rated out of 10 between 0 ('non existent') to 10 ('fantastic')

	<b>Textbook only</b> mean $\pm$ (S.D.*)	<b>E-Book and Textbook</b> mean $\pm$ (S.D.*)	<b>p-value<sup>#</sup></b>
Overall quality of learning experiences from resources provided in the Embryology of the system topic			
Male	6.9 $\pm$ (1.5)	7.7 $\pm$ (1.4)	<b>&lt;0.001</b>
Female	7.4 $\pm$ (1.6)	7.7 $\pm$ (1.6)	<b>0.004</b>
Overall level of interaction with peers using the resources given (e.g., discussion of ideas, etc)			
Male	7.0 $\pm$ (2.0)	7.3 $\pm$ (1.9)	0.126
Female	7.2 $\pm$ (2.1)	7.2 $\pm$ (2.1)	0.871
Level of engagement in using the resources provided			
Male	6.9 $\pm$ (1.8)	7.7 $\pm$ (1.6)	<b>&lt;0.001</b>
Female	7.4 $\pm$ (1.7)	7.7 $\pm$ (1.7)	0.056
Your overall enjoyment of the Embryology system topic over the last 20 minutes of practical class			
Male	6.9 $\pm$ (1.8)	7.7 $\pm$ (1.5)	<b>&lt;0.001</b>
Female	7.6 $\pm$ (1.6)	7.8 $\pm$ (1.6)	<b>0.024</b>

# Paired-sample T-test (2-sided)

\* S.D. = Standard Deviation

## CONCLUSIONS

Use of Embryology E-books significantly improved students' learning experiences in the Anatomy practical class across 'overall quality', 'level of engagement with the resources' and 'overall enjoyment of learning Embryology' (though not 'level of interaction with peers'). In particular, the E-book resource made most difference to male students' quality of learning experiences, engagement with resources, and overall enjoyment in learning across the weekly Embryology topics.

## REFERENCES

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