Analyzing the Relationships between Digital Literacy andSelf-Regulated Learning of Undergraduates – A PreliminaryInvestigation

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Informal Learning Everyday digital technology enhanced informal learning Everywhere √ Unstructured / planned manner (see Sefton-Green, 2004, Ala-Mutka, Ferrari, & Aceto, 2010) Intrinsic motivation √ Learner controlled √ Requires a high degree of self-direction √ Secondary significance or is implicit Explicit purpose , even though it may not be the main purpose (see Shin, 2002, Tan, 2013)

LEARNING via Personal Learning Environments (PLEs)

Students are improvising what they need, rarely limiting to a single technology or even device in order to engage in learning (Johnson et al. 2015).
OPPORTUNITIES FOR FURTHER INVESTIGATION

• The learning opportunities afforded by informal PLE’s (Keppell, 2015)
  • Predominantly experimental approach taken by current studies

• The implications of using informal PLE’s (Liew & Kang, 2014)
  • Effect on self regulated learning (SRL) and digital literacy (DL)
  • How the learning actually takes place
  • What self-regulatory processes students engage in when using PLEs.
PLE AND DL

• PLE is not a software application or collection of tools, but more of a new method of using technologies for learning (Gallego and Gamiz, 2015)

• DL is collection of technical, cognitive and social-emotional literacies associated with online and offline learning with digital technologies (Ng, 2012)
PLE and SRL

• Self-Regulated Learning (SRL) is defined as self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal learning goals (Zimmerman, 2000)

• PLEs, allow learners to regulate their own learning, hence augmenting their learning outcomes (Fruhmann et al., 2010)

(Magno, 2010)
Without successfully applying both skill sets the student would not be able to complete the search task effectively.

Student using the SEARCH tools of PLE

- Plan Task
- Monitor progress and impact on learning
- Evaluate impact on required learning

- Competently use the search tools.
- Be knowledgeable of issues related to web based activities such as plagiarism.
Need to identify, understand and describe how undergraduate students are using and adapting everyday digital technologies for creating informal PLE’s and the resultant impact on their DL and SRL skills.
• RQ1. To what extent and in what ways are the digital literacy skills of students and their self-regulated learning skills interrelated when using an informal PLE?
## METHODOLOGY – MIXED METHODS

<table>
<thead>
<tr>
<th>Technique</th>
<th>Purpose</th>
<th>Sample</th>
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</thead>
<tbody>
<tr>
<td><strong>SURVEY1: Technology use and Digital Literacy Questionnaire - Web based</strong></td>
<td>Self-report measure on frequency of technology use, level of usage, perception of usefulness, proficiency levels, digital skill development methods and scores for technical, cognitive and social emotional literacy based on Ng (2012)</td>
<td>A random sample of first year students</td>
</tr>
<tr>
<td><strong>SURVEY2: Academic Self-Regulated Learning Questionnaire - Web based</strong></td>
<td>Self-report measure of the level of SRL skills based on Magno (2010)</td>
<td>Consecutive sample of all respondents of the first survey, who indicated positive interest in further participation in data collection.</td>
</tr>
<tr>
<td><strong>Face to face semi-structured Interview and Mind map</strong></td>
<td>Mind map to depict PLE. Description of actual individual usage of PLE learning. Discuss past knowledge, opinions, conceptions and self-awareness of SRL and DL skills of the students within their PLE.</td>
<td>Judgmental convenience sample of respondents from the second survey.</td>
</tr>
<tr>
<td><strong>Focus groups</strong></td>
<td>Discuss the use of individual PLEs for learning specifically outside the classroom in a group setting. Focusing on SRL behavior and motivations.</td>
<td>A random sample of the interview participants.</td>
</tr>
<tr>
<td><strong>Academic Performance Data from the university internal learner management system</strong></td>
<td>Understand the manner in which current self-reported SRL skill levels reflect in student performance at learning tasks.</td>
<td>Assessment and performance related information on key technology related courses that they are enrolled in, for all the interviewed students.</td>
</tr>
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</table>
RESEARCH MODEL

• Exploratory nature of the study
• Collective findings of prior research is inconclusive for validating the specification of a non-recursive relationship between the DL and SRL.
• Specify two alternate recursive models
• A random sample of 202 undergraduate students enrolled in courses within the Business faculty
MODEL 1

Digital Literacy

Technical Literacy

Cognitive Literacy

Social Emotional Literacy

Self Regulated Learning

Organizing

Memory Strategy

Learning Responsibility

Environment Structuring

Self Evaluation

Goal Setting

Seeking Assistance
MODEL 2

Digital Literacy

Technical Literacy

Cognitive Literacy

Social Emotional Literacy

Self Regulated Learning

Organizing

Memory Strategy

Learning Responsibility

Environment Structuring

Self Evaluation

Goal Setting

Seeking Assistance
MEASUREMENT MODEL EVALUATION

• The Composite reliability (CR) together with Cronbach alpha for all constructs showed a value above 0.70.
• Average variance extracted (AVE) values for each construct above 0.5
• High indicator cross loadings for each construct
• Fornell Larker criterion examined where the square root of each constructs’ AVE value needs to be greater than its correlation with any other construct.
• Full collinearity variance inflation factors (VIFs) for identifying common method bias for the measurement model was 4.629
MODEL 1: DL EFFECTS ON SRL

<table>
<thead>
<tr>
<th>Path</th>
<th>MS</th>
<th>GS</th>
<th>SE</th>
<th>SA</th>
<th>ES</th>
<th>LR</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL →</td>
<td>β</td>
<td>0.275***</td>
<td>0.621***</td>
<td>0.450***</td>
<td>0.218***</td>
<td>0.486***</td>
<td>0.557***</td>
</tr>
<tr>
<td></td>
<td>effect size</td>
<td>0.187</td>
<td>0.515</td>
<td>0.3</td>
<td>0.147</td>
<td>0.325</td>
<td>0.451</td>
</tr>
<tr>
<td>CL →</td>
<td>β</td>
<td>0.355***</td>
<td>0.047</td>
<td>0.118*</td>
<td>0.182**</td>
<td>0.324***</td>
<td>0.22***</td>
</tr>
<tr>
<td></td>
<td>effect size</td>
<td>0.241</td>
<td>0.036</td>
<td>0.074</td>
<td>0.119</td>
<td>0.212</td>
<td>0.17</td>
</tr>
<tr>
<td>SEL →</td>
<td>β</td>
<td>0.089***</td>
<td>0.184**</td>
<td>(-0.135)*</td>
<td>0.326***</td>
<td>0.124*</td>
<td>0.063</td>
</tr>
<tr>
<td></td>
<td>effect size</td>
<td>0.057</td>
<td>0.143</td>
<td>0.082</td>
<td>0.22</td>
<td>0.07</td>
<td>0.046</td>
</tr>
<tr>
<td></td>
<td>R-squared</td>
<td>0.485</td>
<td>0.694</td>
<td>0.292</td>
<td>0.487</td>
<td>0.607</td>
<td>0.667</td>
</tr>
</tbody>
</table>

Note: * p < 0.05, ** p < 0.01, *** p < 0.001
## MODEL 2: SRL EFFECTS ON DL

<table>
<thead>
<tr>
<th>Path</th>
<th>TL</th>
<th>CL</th>
<th>SEL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MS →</strong></td>
<td>β</td>
<td>0.09</td>
<td><strong>0.116</strong>*</td>
</tr>
<tr>
<td></td>
<td>effect size</td>
<td>0.061</td>
<td>0.077</td>
</tr>
<tr>
<td><strong>GS →</strong></td>
<td>β</td>
<td><strong>0.46</strong>*</td>
<td><strong>0.35</strong>*</td>
</tr>
<tr>
<td></td>
<td>effect size</td>
<td>0.382</td>
<td>0.27</td>
</tr>
<tr>
<td><strong>SE →</strong></td>
<td>β</td>
<td>0.073</td>
<td>0.065</td>
</tr>
<tr>
<td></td>
<td>effect size</td>
<td>0.049</td>
<td>0.041</td>
</tr>
<tr>
<td><strong>SA →</strong></td>
<td>β</td>
<td><strong>0.223</strong>*</td>
<td><strong>0.215</strong>*</td>
</tr>
<tr>
<td></td>
<td>effect size</td>
<td>0.16</td>
<td>0.147</td>
</tr>
<tr>
<td><strong>ES →</strong></td>
<td>β</td>
<td>0.065</td>
<td><strong>0.137</strong>*</td>
</tr>
<tr>
<td></td>
<td>effect size</td>
<td>0.042</td>
<td>0.089</td>
</tr>
<tr>
<td><strong>LR →</strong></td>
<td>β</td>
<td>0</td>
<td>0.052</td>
</tr>
<tr>
<td></td>
<td>effect size</td>
<td>0</td>
<td>0.04</td>
</tr>
<tr>
<td><strong>O →</strong></td>
<td>β</td>
<td>-0.087</td>
<td>0.027</td>
</tr>
<tr>
<td></td>
<td>effect size</td>
<td>0.069</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>R-squared</td>
<td>0.625</td>
<td>0.684</td>
</tr>
</tbody>
</table>
CONTRIBUTION

• PLS-SEM technique confirmed that there are some significant influences of some DL component on some SRL sub process and vice versa.
• Add further empirical validity and clarity to the claims that the use of technology impacts SRL skills
• Show that some SRL skills are instrumental in developing DL skills
• Provide an opening for a comprehensive dialogue among researchers interested in understanding the patterns, contexts and consequences of technology adoption for learning and its specific effects on students’ self-regulatory behaviours
FURTHER WORK

• Evaluate a non recursive model DL and SRL
• 20 interviews conducted
• Participants randomly picked after hierarchical clustering based on digital skills reported in survey
• Each participant asked to draw a mind map of their PLE
• 2 focus groups conducted
• Data is currently being coded for analysis
REFERENCES


Q & A