University teachers’ m-learning approach adoption: Integrating m-technology and m-pedagogy factors into a behavioral intention model

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Background

- Mobile learning (m-learning) is a kind of e-learning that uses mobile technologies to create a learning environment regardless of the time and place (Hamidi and Chavoshi, 2018; Tan et al., 2014).
- M-learning plays an important and growing role in the development of teaching methods in higher education (Milošević et al., 2015).

However

- M-learning has not been completely successfully implemented in universities in China.
- The determinants of teachers' adoption of m-learning are still not clear. (Almaiah, Jalil, & Man, 2016; Althunibat, 2015; Y. Huang, 2014).
Literature Review

- Acceptance of a new system or technology is the first step in its successful implementation (Davis, 1989).
- Technology acceptance model (TAM) explains the influences of external factors on internal beliefs and proposes a continuous relationship between beliefs, attitudes and behavioral intentions that ultimately lead to actual use (Davis, 1989). In follow-up studies, many variables has been added into this model for extending the practical value.
M-learning plays an important and growing role in the development of teaching methods in higher education (Milošević et al., 2015), but the determinants of m-learning acceptance are still not clear.

Most of the existing studies overlooked the investigation of TAM with regard to m-learning studies in general.

Previous studies took too much attention on the effect of technology and mainly focused on students’ adoption of m-learning, so, teachers’ adoption of m-learning seemed to be overlooked.
Theoretical framework

Research question: What are the critical factors of m-learning approach adoption by university teachers?

Proposed research model
Factor in TAM of m-learning

- **Perceived usefulness (PU):** degree of one's belief that m-learning will lead to an improvement in personal performance or learning outcomes (Hao et al., 2017)
- **Perceived ease of use (PEOU):** degree of belief that the use of a particular system will not require effort (Davis, 1989)
- **Perceived behavioral control (PBC):** degree of one’s control over applying technology into classroom
Factor in TAM of m-learning

- **Social norm (SN):** denoting the variances of technology acceptance in various cultural and social environments, including professors, classmates, important people, the media and institutions (Gan and Balakrishnan, 2014; Sabah, 2016).

- **Facilitation condition (FC):** individual beliefs toward the subject of “there is organizational and technical infrastructure to support the use of the system” (Venkatesh et al., 2003), including factors such as resources, knowledge, internet speed and support staff.

- **Self-efficacy (SE):** individual's belief in his ability to perform a particular activity.

- **Pedagogical belief (PB):** “implicit assumptions about students, learning, classroom and subject matter to be taught” (Kagan, 1992).
## Method

### Participants

103 teachers from a research-intensive university in China, who attended ICT training workshops or seminars.

### Instrument

- **5-point Likert scale**
- **24 items covering 8 constructs:**
  - Social norm,
  - Facilitation condition,
  - Self-efficacy,
  - Pedagogical belief,
  - Perceived usefulness,
  - Perceived ease of use,
  - Perceived behavior control,
  - Intention to use

### Data analysis

**Method:**
Partial Least-Squares Structural Equation Modeling (PLS-SEM)

**Tool:** SmartPLS 3.0
Method

◆ First, descriptive statistics
◆ Second, factor analysis, convergent validity and discriminant validity analysis
◆ Last, structural model, PLS algorithm
Results— Structural model assessment

BC -> INT, FC -> PEOU, PB -> BC, PEOU -> INT, PEOU -> PU, SE -> BC, SN -> PEOU are significant.

### Table 6 Standardized coefficients

<table>
<thead>
<tr>
<th>Path</th>
<th>Path coeff.</th>
<th>T values</th>
<th>F^2</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC→INT</td>
<td>0.260**</td>
<td>3.090</td>
<td>0.094#</td>
<td>supported</td>
</tr>
<tr>
<td>FC→BC</td>
<td>0.045</td>
<td>0.679</td>
<td>0.005</td>
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<tr>
<td>FC→PEOU</td>
<td>0.214*</td>
<td>2.256</td>
<td>0.045#</td>
<td>supported</td>
</tr>
<tr>
<td>FC→PU</td>
<td>-0.033</td>
<td>0.382</td>
<td>0.002</td>
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<tr>
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<td>3.940</td>
<td>0.241##</td>
<td>supported</td>
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<tr>
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<td>5.116</td>
<td>0.298##</td>
<td>supported</td>
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<td>PEOU→PU</td>
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<td>10.433</td>
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<td>PU→INT</td>
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<tr>
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<td>0.195##</td>
<td>supported</td>
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<tr>
<td>SN→PU</td>
<td>0.135</td>
<td>1.663</td>
<td>0.022#</td>
<td></td>
</tr>
</tbody>
</table>

*p<0.05, **p<0.01, #small effect ##medium effect ###large effect
Conclusion

Both perceived ease-of-use and perceived behavioral control had significant impact on teachers’ intention to adopt m-learning. However, we did not find significant influence of perceived usefulness on m-learning adoption.

Regarding technology application, ease-of-use is the first priority. The reason why university teachers do not consider usefulness as a critical predictor may due to the fact that teaching in higher education settings seems to require more effort on delivery of complex domain knowledge, which leads to routine use of mobile technology.
Conclusion

- Social norm had larger impact than facilitative condition towards perception of usefulness and ease-of-use, which replicated previous study (Gupta, Dasgupta, & Gupta, 2008). *Cultural influence is a more fundamental factor compared with technology affordance or teacher professional development.*

- Facilitative condition on m-learning only influences perceived ease-of-use, but had no significant impact on perceived usefulness and behavioral control, which suggests that so far teacher training mainly focuses on superficial features of m-technology.

- Self-efficacy and pedagogical belief have significant impact on behavioral control. *To further promote m-learning adoption, it is better to drive the emphasis on* technology delivery to align state-of-art technology with pedagogical innovation and 21st century learning and competence development in higher education system as the whole.
If you have any questions about this study, please feel free to contact with the author.

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Thank you