

# Recognizing and Measuring Self-Regulated Learning in a Mobile Learning Environment

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## Introduction

Realizing ubiquity as the defining feature of mobile learning, this study conceptually and empirically explores how the theories and methodologies of self-regulated learning (SRL) can help us analyze and understand the processes of mobile learning. Self-regulated learning is composed of cognition, motivation, metacognition, and behavior.

There were three research questions:

1. What are the relations between SRL in mobile learning and their perceived parental autonomy support for mobile learning?
2. How are students' SRL and perceived parental autonomy support associated with their engagement in mobile learning activities?
3. How are students' SRL, parental autonomy support, and engagement associated with their achievements in science learning?

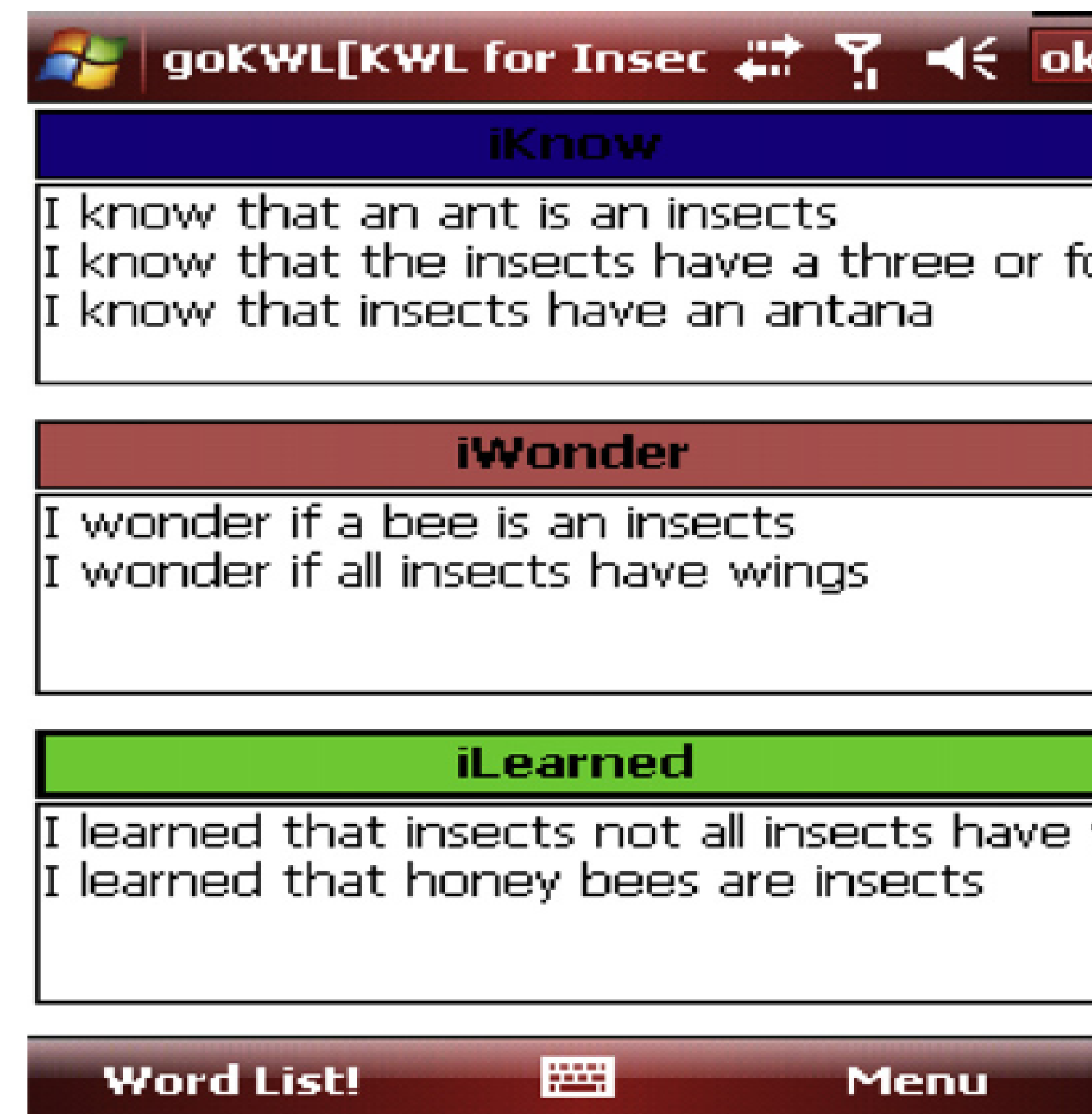
## Method

Location	Two Grade 4 science classes in Singapore
Time	July–August, 2010 (5 weeks)
Valid Participants	67 (38 boys, 29 girls)
Content	Magnet

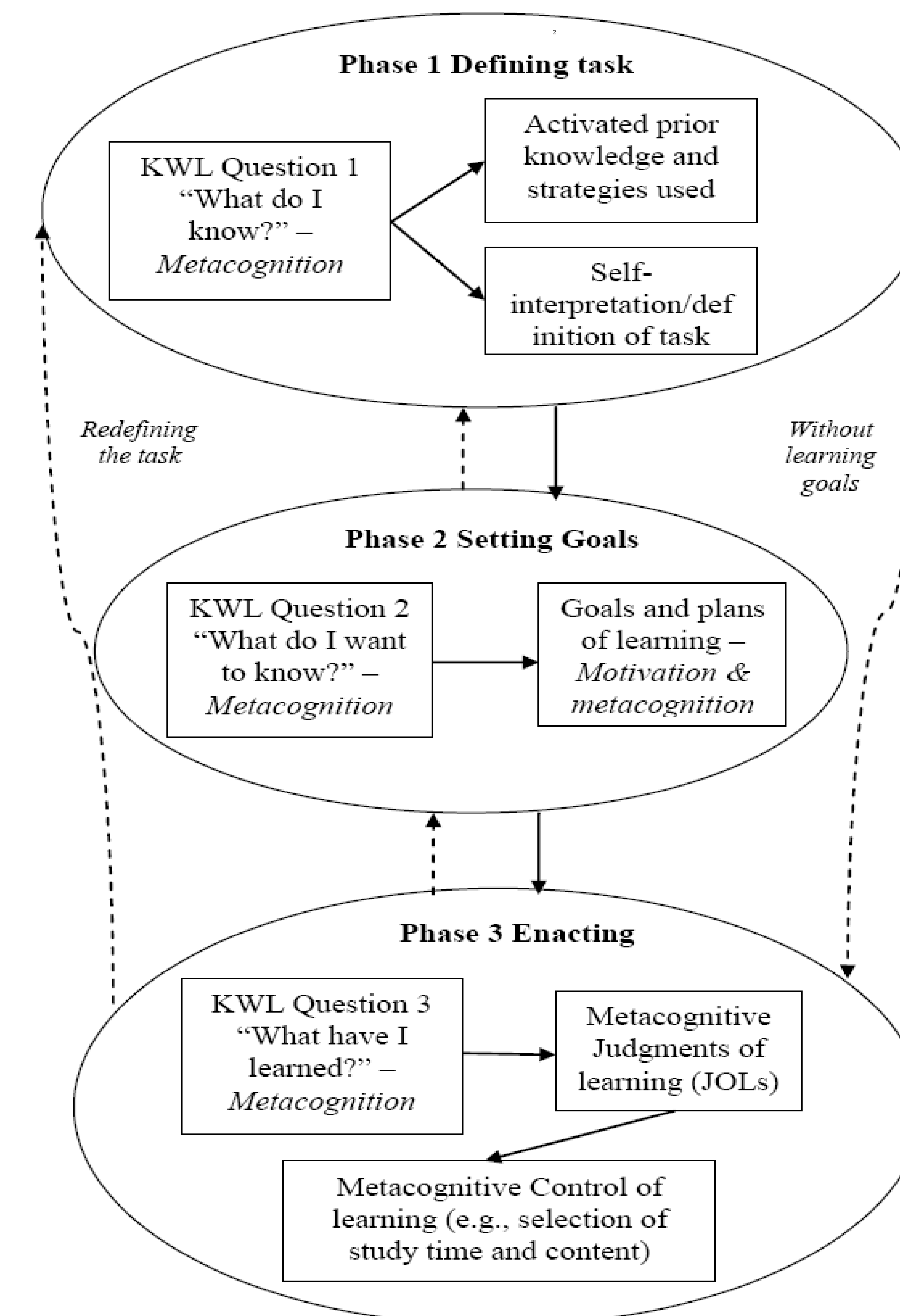
Mobile device	<ul style="list-style-type: none"> <li>Smartphone HTC TyTn II (Taiwan, ROC)</li> <li>Microsoft Windows Mobile 6 operating system</li> </ul>
Components	<ul style="list-style-type: none"> <li>A calculator</li> <li>A calendar</li> <li>Internet access</li> <li>MS Word, Excel, and PowerPoint</li> </ul>
Cognitive & metacognitive tools	<ul style="list-style-type: none"> <li>Sketchy for drawing animation,</li> <li>iKWL for creating KWL tables,</li> <li>PicoMap for concept maps</li> <li>MyProjects for organizing activities</li> </ul>

Items (5-point)	Examples
Self-efficacy	I'm confident I can understand the most difficult concepts of magnet (6 items, $\alpha=.80$ )
Intrinsic motivation	Even when completing the assignments does not guarantee that I get a good grade, I still love to complete them (6 items, $\alpha=.74$ ).
Extrinsic motivation	Getting a good exam score on the concepts of magnet is the most satisfying thing for me right now (6 items, $\alpha=.72$ ).
Regulation of learning	I will normally ask myself questions to make sure I understand the concepts of magnet (6 items, $\alpha=.72$ ).
Parental autonomy support	My parents let me make my own plans for I want to do when I work together with them on the smart-phone (7 items, $\alpha=.78$ ).

The lessons usually started with filling up the KWL table below (What do I know (K)? What do I wonder (W)? And What did I learn (L)?)



Applying Winne's phase model of SRL (2011) to understanding the role of the KWL table as motivational and metacognitive tool in mobile learning



## Outcome variables:

- A continuous variable (Engagement\_KWL) was defined to measure the degree to which individuals engaged in the KWL table.
- A binary variable was defined to measure whether or not individuals engaged in filling up the KWL table.
- The achievement score is the test score on the magnet that was taught in the five week.

## Results

	SE	IM	EM	RL	AS	AC
Self-efficacy (SE)						
Intrinsic motivation (IM)	.39**					
Extrinsic motivation (EM)	-.01	-.29*				
Regulation (RL)	.12	.16	.02			
Autonomy support (AS)	-.25	.12	-.27*	.24		
Achievement (AC)	-.03	.11	.13	-.03	.03	
Engagement_KWL (EN)	.10	-.51**	.13	-.16	.16	-1.9

Logistic Regression on the binary KWL variable

Predictors	Model Estimates (N=67, df=1)		Parameter Estimates (df=1)			
	$\chi^2$	p	B	S.E.	p	Exp(B)
Self-efficacy	0.63	0.43	-0.29	0.37	0.43	0.75
Intrinsic Motivation	0.40	0.53	-0.23	0.37	-0.23	0.37
Extrinsic Motivation	7.64	0.01	0.81	0.31	0.01	2.24
Regulation	0.01	0.93	-0.03	0.29	0.97	0.97
Autonomy support	5.16	0.02	-0.88	0.42	0.04	0.41

## Conclusions

1. Student motivation can account for whether and to what degree the students can actively engage in mobile learning activities (i.e., KWL in this case) metacognitively, motivationally, and behaviorally.
1. The effect of students' self-reported motivation on their learning achievement is mediated by their engagement in answering the KWL questions.
2. Students' perception of parental autonomy support is not only associated with their motivation in school learning, but is also associated with their actual behaviors in self-regulating their learning.

## Acknowledgment & Reference

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Winne, P. H. (2011). A cognitive and metacognitive analysis of self-regulated learning. In B. J. Zimmerman and D. H. Schunk (Eds.), *Handbook of self-regulation of learning and performance*. New York: Routledge.