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# Some Predictors of University Students' Information Literacy

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# IL and related literacies

- Information literacy (IL) linked to other literacies:
  - Scientific literacy (SL)
  - Information and communication technology literacy (ICTL) or computer literacy or digital competences
- IL (ACRL 2000): abilities to recognize when information is needed and locate, evaluate, and use effectively the needed information
- SL (OECD 2002): capacity to use scientific knowledge, to identify questions, and to draw evidence-based conclusions in order to understand and help make decisions about the natural world and the changes made to it through human activity
- ICTL (ETS 2003): using digital technology and communication tools to manage, integrate, evaluate and create information in order to function in a knowledge society



# IL and related literacies

- IL – ACRL Standards (2000): 5 areas of information (need identification, retrieval, evaluation, use, legal/ethical issues)
- IL-related elements contained in other literacies:
  - SL (Catts & Lau 2008): identifying scientific issues by identifying search keywords
  - ICTL (DigComp 2013): identifying, locating, retrieving, storing, organizing and analysing digital information, judging its relevance and purpose
- Areas of focus in this work:
  - SL – general level (derived from PISA)
  - ICTL – use of tools/equipment, ICT rich courses, internet confidence



# IL and psychological factors

- Psychological concepts
  - Academic self-concept (SC): perception of one's academic abilities
  - Self-efficacy (SE): belief in the ability to successfully perform a task
  - Motivation: external (EM), internal (IM)
  - Metacognitive strategies (LS): use of learning strategies
- Previous studies – influence on IL
  - High SC and domain specific SE had positive effect on IL when coupled with high intelligence
  - Low IL SE students were less likely to develop IL competencies for lifelong learning
  - Academic motivation was important in the development of IL competencies
  - EM and IM (especially IM to know) was positively related to IL SE
  - LS could predict IL SE

# Aims of our study

- Investigate the influence of several predictors on IL:
  - Scientific literacy (SL)
  - ICT literacy: software use (ICT-S), hardware use (ICT-H), ICT-rich courses (ICT-C), internet confidence (ICT-I)
  - Psychological factors: self-concept about learning (SC-L), self-concept about problem-solving (SC-P), general self-efficacy (SE), internal motivation (IM), autonomous (EM-A), controlled external motivation (EM-C), use of metacognitive learning strategies (LS)
- Assess the difference in students' IL after a stand-alone IL course, based on ACRL standards





## Research hypothesis

- Positive effect on IL by SL, ICT use (software, hardware), ICT reach courses, internet confidence, academic self-concept (learning, problem solving), general self-efficacy, academic motivation (internal, external) and metacognitive learning strategies
- Significant improvement of IL after the IL course

## Materials and methods

# Measuring instruments

- Information Literacy Test (ILT): 40-item multiple-choice knowledge test (Boh et al. 2016)
- Scientific Literacy Test (SLT): knowledge test. 6 problem-based tasks, 23 items (derived from PISA 2006)
- ICT Use survey: 35 items, 5 point Likert + numeric, 4 subscales (ICT-S: 16 items, ICT-H: 4 items, ICT-C: 5 items, ICT-I: 10 items) (Šorgo et al. 2017)
- Self-concept/Self-efficacy/Motivation/Learning strategy questionnaire: 70-items, 5-point Likert, 7 subscales (SC-L: 10 items, SC-P: 10 items, SE: 10 items, IM: 13 items, EM-A: 6 items, EM-C: 6 items, LS: 15 items) (Juriševič et al. 2016, partly derived from SDQ and GSE)



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## Materials and methods

# IL study course (ILSC)

- Compulsory, credit-bearing
- 45 contact hours
- 5 ACRL standards
- Lectures, practical work
- Examples with problem solving, linked to the study field



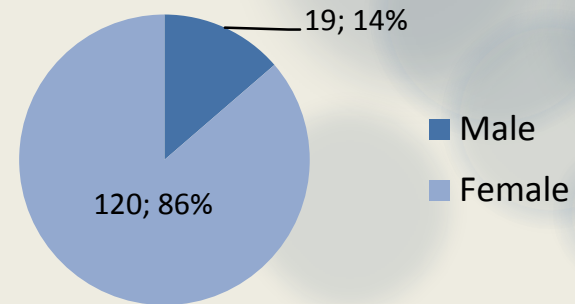


## Materials and methods

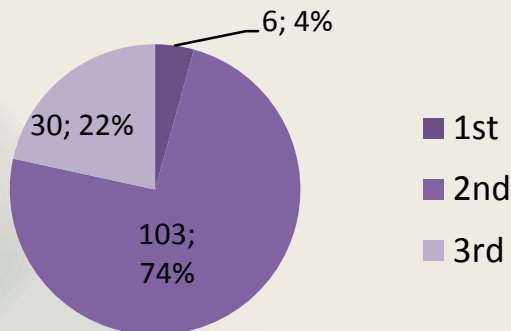
# Test group

- 139 undergraduate students
- 3 faculties, 4 study programmes
- 3 study years

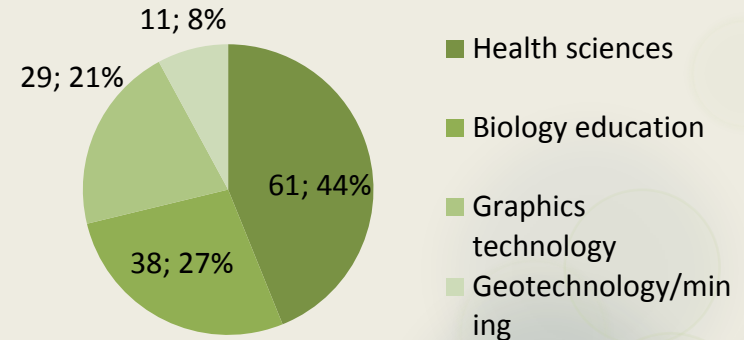
Students by gender



Students by study year



Students by study programme





## Materials and methods

# Data analysis

- Descriptive statistics
- Scale reliability (Cronbach  $\alpha$ )
- Effectiveness of IL course: paired samples t-test (pre/post-test)
- IL, SL and ICT use by study years
- Correlations among scales: Pearson's  $r$
- Predictors: Multiple linear regression on ILT pre-test



## Results

# Descriptive statistics and reliability

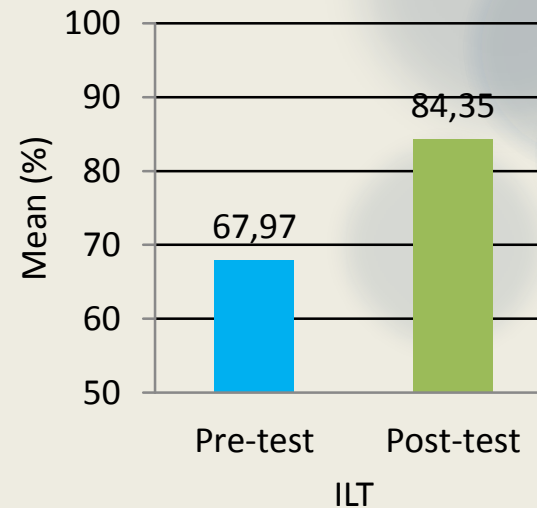
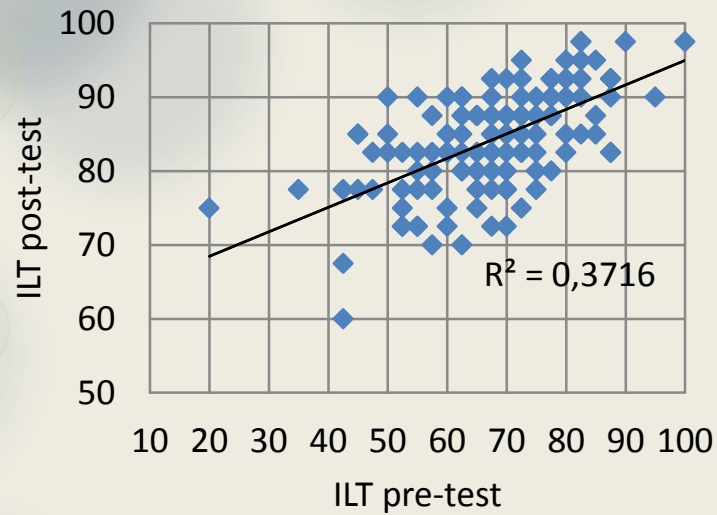
N=139

Topic	Scale/subscale	M	SD	$\alpha$	Items
Information literacy	ILT (pre-test)	67.97	12.62	0.738	40
	ILT (post-test)	84.35	6.85		
	ILT (difference)	16.38	10.04		
Scientific literacy	SLT	67.91	13.54	0.607	23
ICT use	ICT-S (software)	2.68	0.35	0.710	16
	ICT-H (hardware)	3.22	0.59	N/A	4
	ICT-C (courses)	4.95	2.05	0.666	5
	ICT-I (Internet confidence)	3.50	0.54	0.783	10
Self-concept	SC-L (learning)	3.84	0.46	0.757	10
	SC-P (problem solving)	3.45	0.50	0.747	10
Self-efficacy	SE	3.73	0.46	0.812	10
Motivation	IM (internal)	3.57	0.50	0.830	13
	EM-A (autonomous external)	3.93	0.50	0.670	6
	EM-C (controlled external)	3.38	0.60	0.655	6
Learning strategy	LS	3.61	0.40	0.629	15

## Results

# ILT pre-test/post-test difference

N=139

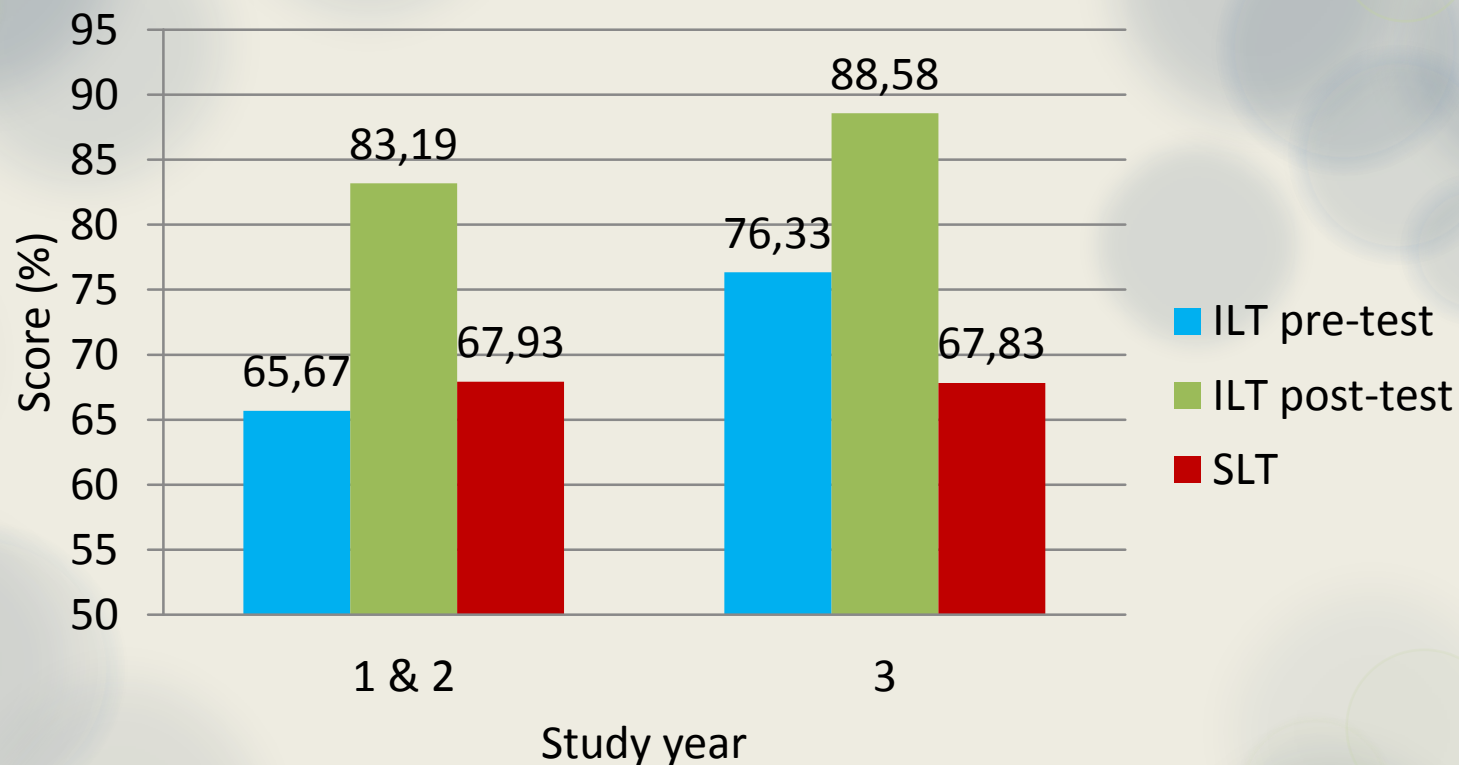


Pre-test		Post-test		t	p<	d	Mean Diff.	Conf. Int.	
Mean	St. Dev.	Mean	St. Dev.					Lower	Upper
67.97	12.62	84.35	6.85	19.246	0.001	1.61	16.38	14.70	18.07



## Results

# ILT and SLT scores by study year

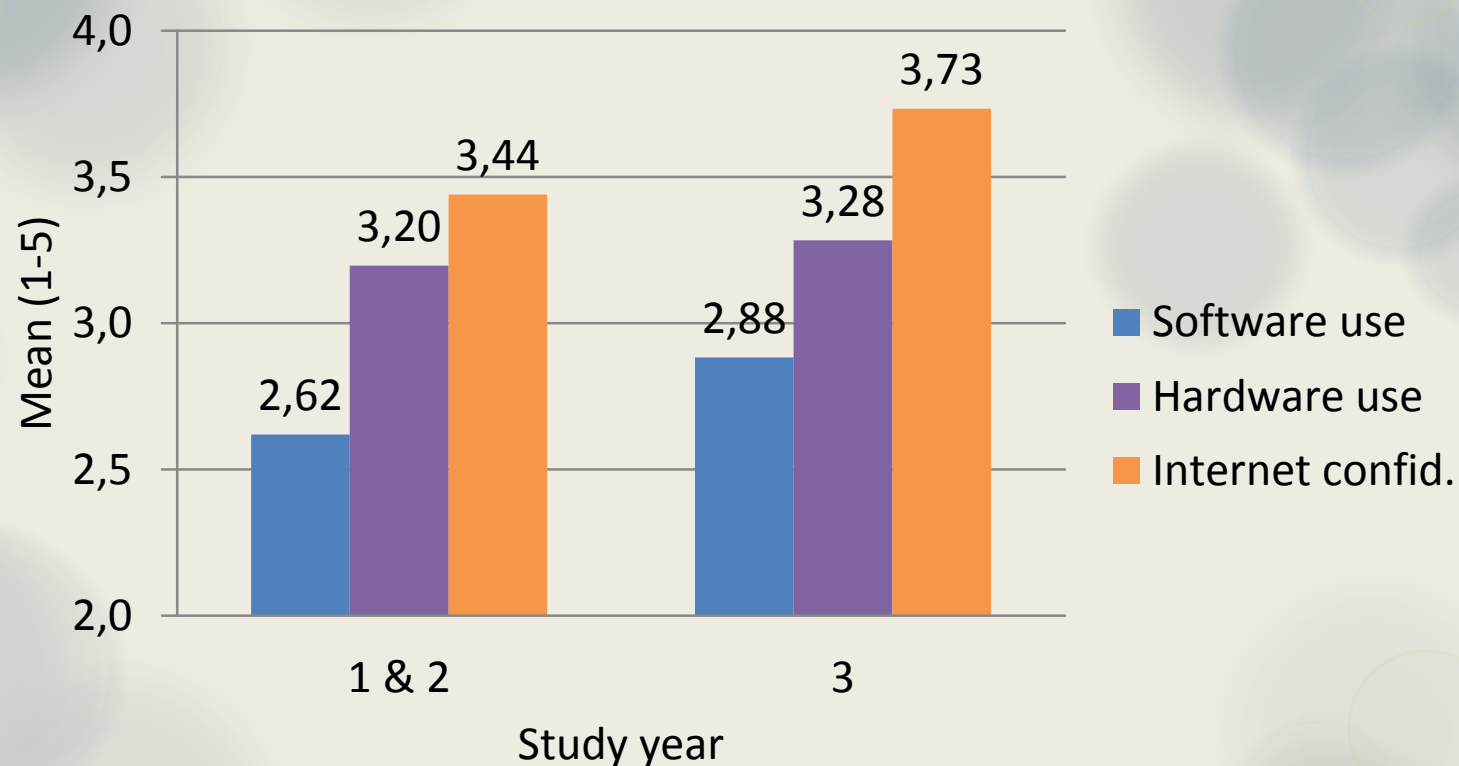






## Results

# ICT use and internet confidence by study year





## Results

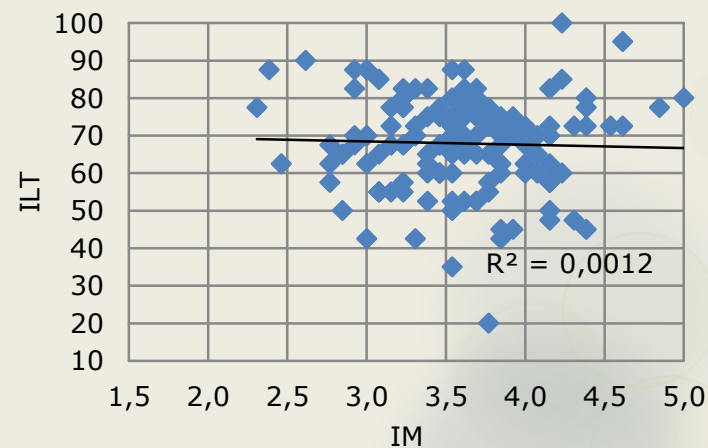
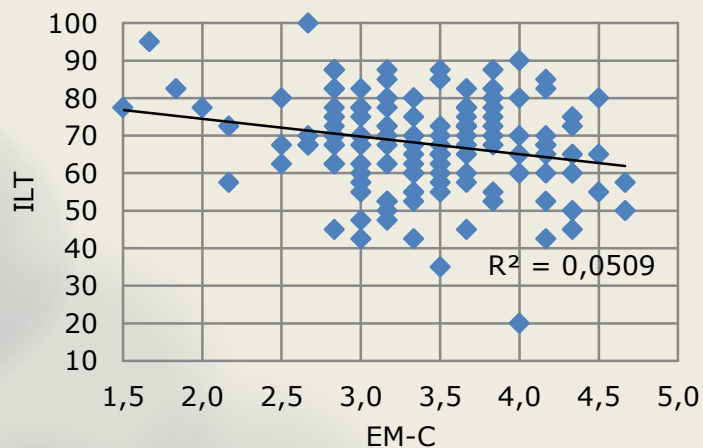
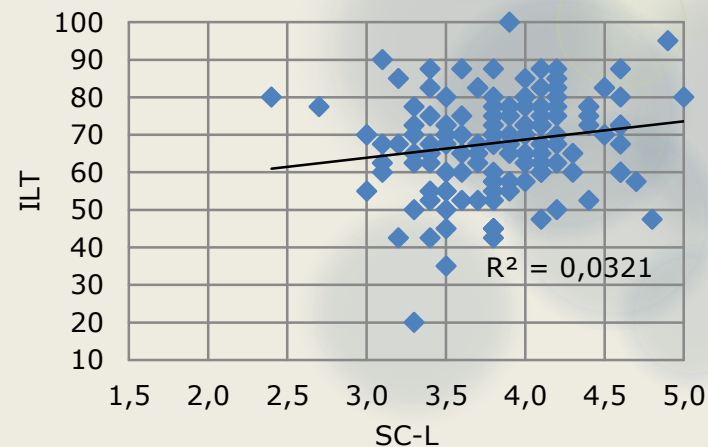
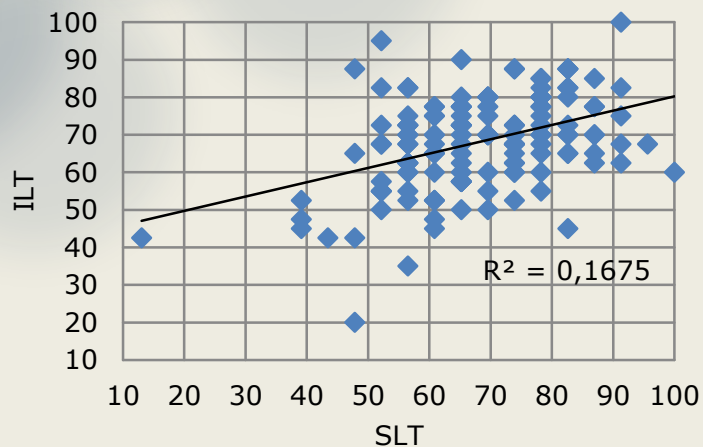
# Correlations among scales

	ILT-pre	ILT-pos	ILT-dif	SLT	ICT-S	ICT-H	ICT-C	ICT-I	SC-L	SC-P	SE	IM	EM-A	EM-C
ILT-pos	0.61													
ILT-dif	-0.84	-0.08												
SLT	0.41	0.25	-0.34											
ICT-S	0.10	0.00	-0.12	-0.02										
ICT-H	-0.10	-0.11	0.06	-0.14	0.38									
ICT-C	-0.01	0.04	0.04	0.04	0.16	0.03								
ICT-I	0.10	0.07	-0.08	-0.06	0.23	0.10	0.03							
SC-L	0.18	0.03	-0.21	0.07	0.12	0.03	0.15	0.10						
SC-P	0.16	0.09	-0.14	0.07	0.35	0.14	0.16	0.25	0.28					
SE	0.14	-0.01	-0.18	0.00	0.24	0.15	0.08	0.32	0.41	0.64				
IM	-0.03	0.00	0.05	-0.14	0.30	0.12	0.12	0.25	0.61	0.36	0.52			
EM-A	0.13	0.08	-0.10	0.03	0.16	-0.09	0.13	0.05	0.42	0.15	0.26	0.54		
EM-C	-0.23	-0.16	0.18	-0.07	0.02	0.09	-0.04	0.01	-0.03	-0.31	-0.21	0.01	0.27	
LS	-0.10	-0.13	0.03	-0.02	0.18	0.02	0.11	0.02	0.46	0.16	0.30	0.57	0.53	0.14



## Results

# Correlations among scales



## Results

# Multiple linear regression

	Unstand. Coeff.		Stand. Coeff.			95.0% Confid. Inter. for B		Correlations			
Predictor	B	Std. Err.	$\beta$	t	Sig.	Lower	Upper	Zero-order	Partial	Part	% expl.
(Constant)	13.890	5.756		2.413	0.017	2.499	25.281				
<b>SLT</b>	<b>0.545</b>	0.124	0.336	4.382	<b>0.000</b>	0.299	0.791	0.409	0.364	0.319	<b>13.74</b>
ICT-S	1.989	1.249	0.139	1.593	0.114	-0.482	4.460	0.095	0.140	0.116	1.32
ICT-H	-0.449	0.705	-0.053	-0.637	0.525	-1.844	0.945	-0.104	-0.057	-0.046	0.55
ICT-C	-0.176	0.184	-0.072	-0.955	0.342	-0.541	0.189	-0.007	-0.085	-0.069	0.05
ICT-I	1.054	0.743	0.114	1.419	0.158	-0.416	2.524	0.104	0.125	0.103	1.19
<b>SC-L</b>	<b>2.589</b>	1.053	0.238	2.458	<b>0.015</b>	0.505	4.674	0.179	0.214	0.179	<b>4.26</b>
SC-P	-0.253	1.035	-0.025	-0.245	0.807	-2.302	1.795	0.158	-0.022	-0.018	-0.40
SE	0.708	1.187	0.064	0.596	0.552	-1.642	3.057	0.135	0.053	0.043	0.86
IM	<b>-2.411</b>	1.206	-0.237	-2.000	<b>0.048</b>	-4.797	-0.025	-0.035	-0.175	-0.145	0.83
EM-A	<b>2.874</b>	1.002	0.283	2.868	<b>0.005</b>	0.891	4.857	0.126	0.248	0.209	3.57
<b>EM-C</b>	<b>-1.918</b>	0.706	-0.229	-2.715	<b>0.008</b>	-3.315	-0.520	-0.226	-0.235	-0.197	<b>5.18</b>
LS	<b>-2.722</b>	1.193	-0.218	-2.283	<b>0.024</b>	-5.082	-0.362	-0.100	-0.199	-0.166	2.18
Sum											33.33

# Results

IL study course:

- Significant improvement in IL level at post-test (mean diff. 16.38%)

Predictors of IL level (pre-test):

- All predictors explained 1/3 (33.33%) of variation in IL
- SL the most significant predictor of IL (13.74%)
- ICT use, internet confidence with no significant influence on IL
- SC-L significant positive predictor of IL (4.26%)
- EM-C significant negative predictor of IL (5.18%)
- IM with suppressor role





## Conclusions

- Students, literate in science are more likely to be information literate.
- Digital natives aren't automatically information literate.
- Students' developed self-concept for learning is useful in acquiring IL knowledge.
- Students, reliant on teacher motivation have poorer IL skills, but can improve significantly after the IL course.
- Students' internal motivation enhances the influence of self-concept for learning on IL.
- The introduction of the IL course was the most beneficial for students with low initial IL level.

## Acknowledgement

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