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Secondary school teachers' attitudes to information literacy: a study of aquestionnaire validity

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Abstract. The objective of this paper is to determine the validity and reliability of an originally created questionnaire as an instrument to develop an understanding of secondary school teachers' knowledge on information literacy and practices implemented with developing student's information literacy skills in Hungary, Poland, and Lithuania. This research will support a research project that aims the harmonisation of various theories of information literacy with the proper application of information literacy to public (K12) education. This paper presents a pilot survey among Lithuanian teachers on a sample of 102 participants in the spring of 2018. We gathered data for this study using a computer-assisted web interviewing (CAWI) technique and administered an online survey using the 1KA.SI web survey tool. The collected data was analysed by IBM SPSS Statistics ver. 19. Internal consistency of the questionnaire measured by Cronbach`s alpha coefficient. Scale and construct validity evaluated using Principal components analysis with Varimax Rotation. The authors feel assured in using the questionnaire for the wider scope survey.
Keywords: information literacy, teachers, secondary school, the Big6.

1 Introduction

1.1. Aims of the study

This paper describes a pilot study with the aim of determining the validity and reliability of a created questionnaire. The questionnaire is an instrument to gain an understanding of secondary school teachers' knowledge of and attitudes toward IL, as well as practices implemented to develop student's IL skills in Hungary, Poland, and Lithuania.

1.2 Background

The members and associated members of the research team were from Hungary, Lithuania, and Poland , working under the auspices of the Doctoral School of Education at Eszterházy Károly University, Hungary. They decided to investigate the possible prerequisites of coupling IL theory with school pedagogy. They think that not only can pedagogybe used in primary and secondary schools, but it can be used along with a form of educational theory and practice. That theory and practice is built on the assumption that its goals are attainable only in a growingly holistic system of institutions, mutually influencing each other, where pupils act autonomously and their self-organisation and self-regulation are enabled [1].

2 Theoretical Background

The nature of IL recently has undergone various changes, causing an overlap between IL and media literacy, as well as between IL and media and IL. All aim to foster the same skills while addressing different information constructs (for example, the printed word by IL and films and videos by media literacy) [2].

Taking into account that the overlap between IL and media literacy broadens the meaning of IL, we adopted its new definition by CILIP (2018) as follows:

"Information literacy is the ability to think critically and make balanced judgements about any information we find and use. It empowers us as citizens to develop informed views and to engage fully with society." [3].

This new definition of IL comprises not only IL itself, but media literacy, digital literacy, as well as information and IL (MIL).

Besides acknowledging the importance of a multiliteracies approach, originating in the ideological models of literacy [4], we see that there are convincing arguments that theoretical foundations of IL need to be strengthened [5].

It is also reasonable to suggest that discourses on education and IL are closely connected to each other and school is one of the information landscapes (communicative spaces), within which IL occurs [6].

We believe that harmonising IL theory with school pedagogy requires that we transcend the views of information users as incompetent non-knowers [7]. On the other hand, IL theory should be based on a plurality of approaches, in other words not being restricted to skill-based ones, but retaining their advantages.

This effort needs to be adjusted to the properties of the digital environment [8]. One of the reasons for this is in the fact that IL – while originally dominated by questions of access, due to the scarcity of information [9] – functions today in an environment, where there is an overabundance of information that causes information overload to a greater extent than ever [10]. In addition to this, we believe that IL has to be seen as communication, not forgetting about its complexity. Therefore, we should pay attention to additional issues, such as informational knowledge, operational knowledge as well as the motivating factors to acquire information.

Whatever theoretical deliberations we have, clearing the relationship between research and practice is a perpetual challenge. [11] This fact gave the motivation to start a survey to acquire empirical data on the understanding of secondary school teachers' knowledge

on IL. The present study is a part of this effort.

The investigation, described in this paper is about the preliminary phase of modest, but practical contribution to the successful exploration of IL in school settings, described above.

3 Method

3.1 Data Collection and Participants

We conducted the study in the form of a survey using Computer-assisted web Interviewing (CAWI) and gathered data via an online survey tool 1KA.SI, an open source software.

Data collection started on the 22nd of February 2018 and ended on the 27th of March 2018. Respondents to the survey were teachers from secondary schools in Lithuania. We selected respondents for the research from the top nine best secondary schools in Lithuania (we used the official school ranking list in Lithuania). By the end of the survey period, we gathered data from 102 school teachers – response rate was 23%. Almost half (49 %) of those who entered introductory page finished the survey. We collected the data following confidentiality procedures.

Age of the participants: from 20 to 29 years – 4.9%; from 30 to 39 – 14.7%; from 40 to 55 – 52%; older than 55 – 27.5%.

Main teaching discipline: languages – 30.4%, Ethics and Religion – 2%, Physical Education – 1%, STEAM 47.1%, Arts – 3.8%, History and Geography – 8.8%, Technology – 2%, Economics – 2.9%, Psychology – 2%.

Student levels that mainly teach: Years 5-7 – 2.9%, Years 8-10 – 13.7%, Years 11-12 – 52 %, Years 9-12 – 29.4%.

Experience in teaching: less than five years – 5.9%, 5-9 years – 2.9%, 10-14 years – 5.9%, longer than 14 years – 84.3%.

3.2 Measures

We created the questionnaire for developing an understanding on secondary school teachers' knowledge on IL and practices implemented in developing student's IL skills (acronym – KILS). This tool consists of 26 items grouped into three categories.

The first category – demography: asked questions about the main teaching discipline, levels mainly taught, experience in teaching, and age band.

The second category – teachers' familiarity with IL: asked questions about readiness for teaching IL, main source of IL skills, and opinion about what IL is, being prepared to teach IL and schools policy onIL, experience in ILteaching, whose responsibility to teach IL should be, and familiarity with concepts of information literacy and media literacy.

The third category – students' IL skills: teachers were asked to evaluate their students' IL skills through the five-point Likert scale: 1 – very low, 2 – below average, 3 – average, 4 – above average, 5 – very high. We based the design of this part on the Big6 six-stage model [11].

This research sought to test a questionnaire designed to collect data for the understanding of secondary school teachers' knowledge on IL and practices implemented for developing student's IL skills. We intended to find out:

- if there was awareness of the existence and importance of IL and media literacy;
- how they acquired their IL skills;
- if they felt prepared to teach IL skills themselves; and,
- what experience they had with IL teaching.

We implemented a pilot survey in Lithuania. We planned the tested and validated a questionnaire to use on a wide scale survey in three countries: Hungary, Poland, and Lithuania. This research will support a research project that aims the harmonisation of various theories of IL with the proper application of IL to public (K12) education. The authors invite researchers to use the same questionnaire in their countries and share data for comparison of results.

3.4. Analytical Approach

This study aimed to determine the validity and reliability of the KILS. We used Cronbach`s alpha coefficient to measure the questionnaire's internal consistency. Also, we implemented a Principal components analysis with Varimax Rotation for an evaluation of scale construct validity. We used two statistical tests to define if the subscales were suitable for factor analysis: a) the criterion of Kaiser-Meyer Olkin Measure of Sampling Adequacy (KMO) to measure sample sufficiency; b) the Bartlet Test of Sphericity to examine the inter-independency of scale subscales.

4 Findings

4.1 General Results

The coefficient of a Cronbach alpha was 0,701. The group of questions was consistent when Cronbach alpha coefficient was higher than 0.7 [12]. If we continue with the Cronbach`s Alpha based on standardised items, the coefficient would slightly increase to 0.745. It shows no need to increase the number of the items in the questionnaire.

Analysis of Corrected Item-Total Correction, Square Multiple Correlation and Cronbach`s Alpha if Item Deleted (Table 1.) showed that we could consider removing six items (numbers accordingly: 1, 12, 14, 16, 20, 24) from the survey. Or we could consider testing additionally to improve the questionnaire`s internal consistency because of a low Corrected Item-Total Correction and Square Multiple Correlation. On the other hand, Cronbach`s Alpha if Item Deleted is not substantially higher – the highest coefficient is 0.720. So, we decided to leave these items in a questionnaire. Also, there was no higher value of multiple square correlations. It suggests no items were measuring the same characteristic as the other items. Cronbach`s Alpha if Item Deleted had fairly consistent values for all omitted items. It suggests that all items measured the same characteristic.

Table 1. Item-Total Statistics*

Items	*Corrected Item-Total Correlation*	*Squared Multiple Correlation*	*Alpha if Item Deleted*
1. What is your main teaching discipline?	,171	,283	,707
2. The student levels that I mainly teach are …	,336	,501	,686
3. I have been teaching for …	,196	,720	,695
4. Age band	,192	,707	,696
5. identifying need for information**	,396	,509	,686
6. identifying reliable information sources needed to address a given problem	,444	,612	,681
7. finding needed information	,433	,614	,683
8. evaluating the information	,475	,789	,681
9. synthesising information	,390	,765	,684
10. citing sources appropriately	,403	,577	,683
11. How would you describe your readiness for teaching information literacy?	,008	,611	,712
12. What was the main source of your information skills?	-,079	,204	,719
13. Information literacy skills are the same as library skills	,312	,409	,686
14. Information literacy skills should be taught explicitly	,270	,262	,690
15. Information literacy is concerned mostly with ICT	,536	,498	,669
16. Information skills will develop naturally as students do more research assignments	,360	,387	,681
17. I feel prepared to teach information literacy skills by myself	-,046	,669	,720
18. I am acquainted with common methods/ process for helping students to deal with information	,180	,474	,697
19. I expect students coming to secondary school already have good information skills	,558	,577	,665
20. I see a librarian as an expert in educating information literacy	,212	,413	,694
21. My school has a school-wide plan of information literacy skills development	,417	,691	,675
22. At my school, I am provided with a variety of strategies for teaching information skills to students	,343	,700	,683
23. What is your experience in information literacy teaching?	,049	,578	,705
24. Whose responsibility to teach information literacy skills should be?	-,032	,365	,715
25. Are you familiar with the concept of information literacy?	,174	,660	,697
26. Have you ever heard about media literacy?	,235	,500	,696

* The order of items in a table is not the same as in the questionnaire.

** Items from 5 to 10 are part of a question: How would you rate your student's ability in IL skills.

4.2 Principal components analysis with Varimax Rotation

By implementing a principal components analysis with Varimax Rotation, we wanted to find out several aspects, that could help to optimise the questionnaire. As this was a

pilot study, we tested a new questionnaire and we wanted to find out which of items could be left out. Reasons for leaving them could be: a) the items measure the same underlying construct (if there are two highly correlated we consider to leave on which represents construct best); the items are not sufficiently representative of the construct we are interested in; and/or c) we want to find out which items may be measuring the same construct.

We used the correlation matrix to check patterns of relationships. We checked for the correlation coefficients, which were greater than 0.9 to avoid a problem of singularity in the data. Also, we checked for items which do not correlate (lower than 0.3). There was no need for eliminating any items at this stage.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy test was implemented to measure how our data is suitable for Factor Analysis. The result was 0.708. Factor analysis was appropriate for this data and proves that patterns of correlation should show distinct and reliable factors. The result fell into the range from 0.7 to 0.8 and was considered as good by Kaiser [14]. He outlined that the values greater than 0.7 indicates patterns of correlations being relatively compact.

Bartlett`s Test of Sphericity test checks whether the correlation matrix is not an identity matrix and should have value less than 0.05. In our case, Bartlett's test was highly significant ($p < 0.000$) and therefore factor analysis was appropriate.

Both tests show the data was acceptable for conducting factor analysis.

Table 2. Principal Component Analysis

Factor	**Content**	**Eigenvalue**	**Variance Explained (%)**
F1	1a. evaluating the information (.871), communality (.794) 1b. synthesising information (.838), communality (.764) 1c. finding needed information (.790), communality (.725) 1d. identifying reliable information sources needed to address a given problem (.752), communality (.658) 1e. identifying need for information (.716), communality (.672) 1f. citing sources appropriately (.666), communality (.557)	5.4	15.9
F2	2a. I feel prepared to teach information literacy skills by myself (.885), communality (.833) 2b. How would you describe your readiness for teaching information literacy? (-.825), communality (.758) 2c. I am acquainted with common methods/ process for helping students to deal with information (.701), communality (.661)	3.64	9
F3	3a. My school has a school-wide plan of information literacy skills development (.759), communality (.781) 3b. At my school, I am provided with a variety of strategies for teaching information skills to students (.716), communality (.774) 3c. Information literacy skills should be taught explicitly (.572), communality (.439) 3d. I expect students coming to secondary school already have good information skills (.541), communality (.705)	2.31	8.48
F4	4a. Whose responsibility to teach information literacy skills should be? (.801), communality (.682) 4b. The student levels that I mainly teach are … (.691), communality (.638) 4c. What is your experience in information literacy teaching?	1.68	8.16

	(.603), communality (.669)		
F5	5a. I have been teaching for … (.876), communality (.845) 5b. Age band (.846), communality (.847)	1.39	7.71
F6	6a. Have you ever heard about media literacy? (.723), communality (.634) 6b. Are you familiar with the concept of information literacy? (.698), communality (.746) 6c. What was the main source of your information skills? (.666), communality (.522)	1.27	7.41
F7	7a. Information literacy skills are the same as library skills (.740), communality (.635) 7b. Information skills will develop naturally as students do more research assignments (.696), communality (.547) 7c. I see a librarian as an expert in educating information literacy (.498), communality (.548)	1.10	7.16
F8	8a. What is your main teaching discipline? (.864), communality (.813) 8b. Information literacy is concerned mostly with ICT (.462), communality (.641)	1.05	4.88

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization (Rotation converged in 9 iterations).

Factor 1 (from 1a to 1f) accumulated items related to the Big6 skills.

Factor 2 (from 2a to 2c showed teachers preparedness to teach IL skills.

Factor 3 (from 3a to 3d) accumulated items related to formal rules on IL teaching at the school.

Factor 4 (from 4a to 4c) represented two items (2d and 3d) that were related to experience in teaching, and one item was logically unrelated (1d).

Factor 5 (from 5a to 5b) represents items, that were not logically related.

Factor 6 (from 6a to 6c) accumulated items related to acquainted withIL .

Factor 7 (from 7a to 7c) represented two items (1g and 2g) that were related to the way IL skills evolves, and one item (3g) is logically unrelated.

Factor 8 (from 8a to 8b) accumulated items, that were not logically related.

4 Discussion

Our main goal was to test out our freshly created questionnaire before starting a full-scale survey. We collected data for a pilot study that represented a whole range of age, discipline, student levels, and experience. It made us confident to proceed to further analysis. We decided to choose Lithuania for the pilot study.

Cronbach`s Alpha showed that the group of questions was consistent, all items measured the same characteristics, and the results showed no need to leave out any items. A deeper analysis of results made us check the results with other statistical methods. The results showed positive signs that our data is suitable for factor analysis. This method was more useful for finding overlapping items in the questionnaire. Factors analysis showed that there are two groups of items (5 in total), that we could merge into two items.

Factor analysis showed that items 2a. *I feel prepared to teach information literacy skills by myself*, 2b. *How would you describe your readiness for teaching information literacy*?,

and 2c. *I am acquainted with common methods/ process for helping students to deal with information* could be made to one item: a) I feel prepared to teach information literacy skills by myself.

Secondly, factor analysis showed that items 3a. *My school has a school-wide plan of information literacy skills development*, and 3b. *At my school, I am provided with a variety of strategies for teaching information skills to students* could be merged to one item – At my school, I am provided with a variety of strategies for teaching information skills to students.

Factor analysis also showed a need to regroup questions order in a questionnaire following the order outlined after implementing Principal Component Analysis.

Before starting, a full-scale survey there would be a need to implement small pilot studies in Poland and Hungary to test out issues related with translation to respective languages.

Authors invite to use this questionnaire in other countries and to share collected data with others to have a wider context for results interpretation.

6 Conclusions

The purpose of our research was to examine the convergence between IL and school pedagogy. For this, we created a new measurement tool. In the present survey, we tested the validation and reliability of the measuring instrument, the questionnaire. The sample tested was n = 102 of the Lithuanian elite secondary school teacher population. When constructing our questionnaire, we separated three categories containing 26 items. The first part of our categories focused on demographic data; in the second phase, we were curious about the extent to which the teachers had their knowledge of IL until the teachers were able to disclose their students' IL knowledge in the last block. As shown in the first table our questionnaire was consistent enough. The Cronbach alpha coefficient fell to the ideal range from 0.70 to 0.85 accordingly. All items measured the same characteristics. Cronbach`s alpha showed no need to leave out any items. From now on, due to the Bartlett's test's high significance, the factor analysis was found as suitable for factor analysis. Factor analysis showed that we could shorten the questionnaire by at least three items. Authors conclude that after removing those items, the questionnaire will be suitable for a full-scale survey.

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Appendix

The questionnaire for developing an understanding of secondary school teachers’ knowledge on information literacy and practices

1. What is your main teaching discipline? [open question]

2. How would you rate your student's ability in information literacy skills?
1=Very Low, 2=Below Average, 3=Average, 4=Above Average, 5=Very High
Choices: a) identifying need for information; b) identifying reliable information sources needed to address a given problem; c) finding needed information; d) evaluating the information; e) synthesising information; f) citing sources appropriately.

3. How would you describe your readiness for teaching information literacy?
Choices: a) I feel very well prepared to teach IL courses; b) I think I should learn more myself to teach IL courses; c) I would like first participate myself in organised IL course to teach IL courses; d) I would like to teach IL courses with cooperation with some other person (i.e. librarian); e) I don't think I could teach IL courses; f) Other [open question].

4. What was the main source of your information skills?
Choices: a) It was part of my study program; b) I participated in special additional courses dedicated to IL; c) I learn with the help of my colleagues/ family; d) I learn myself; e) I have never had the courses dedicated to IL; f) Other [open question].

5. In my point of view …
1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree
Choices: a) Information literacy skills are the same as library skills; b) Information literacy skills should be taught explicitly; c) Information literacy is concerned mostly with ICT; d) Information skills will develop naturally as students do more research assignments.

6. I agree or disagree that …
1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree
Choices: a) I feel prepared to teach information literacy skills by myself; b) I am suited with common methods/ process for helping students to deal with information; c) I expect students coming to secondary school already have good information skills; d) I see a librarian as an expert in educating information literacy; e) My school has school-wide plan of information literacy skills development; f) At my school I am provided with a variety of strategies for teaching information skills to students.

7. What are your experience in information literacy teaching?
Choices: a) I taught the course dedicated to IL; b) I was cooperating with other teachers in teaching/ preparing course dedicated to IL; c) During my courses I included some materials connected to IL; d) I think that IL teaching is not the topic I should be concerned; e) Other [open question].

8. Whose responsibility to teach information literacy skills should be?
Choices: Teachers' responsibility; Librarians' responsibility; Led by teachers, but in collaboration and support of librarians; Other [open question]

9. Are you familiar with the concept of information literacy? Choices: Yes; No; Other [open question]

10. Have you ever heard about media literacy? Choices: Yes; No; Other [open question]

11. The student levels that I mainly teach are … Choices: Y 5-7; Y 8-10; Y 11-12; Other [open question]

12. I have been teaching for … Choices: Less than 5 years; 5-9 years; 10-14 years; longer than 14 years

13. Age band. Choices: 20-29 years of age; 30-39; 40-55; 55 plus