Research methodology enabling to determine study programmes ability to produce the librarians as educators

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Abstract. The report discusses the possibilities of researching study programmes used for preparing professional librarians. Its purpose was to test the research methodology, allowing determining whether study programmes used for preparing professional librarians produce the entirety of competencies necessary for librarians as educators. Research made use of components of three Lithuanian institutions of tertiary education that provide study programmes designed for preparing professional librarians. The research proved that the Standards for Proficiencies for Instruction Librarians and Coordinators coupled with factor analysis may be an appropriate method for the assessment of study programmes designed for training future professional librarians. This research is interesting in two aspects: a) it uses standards developed by the professional librarian community that define the entirety of competencies necessary for a librarian as an educator; b) analysis of relevant data employed factor analysis and multidimensional statistical scaling, usually used to determine interdependencies between objects of study or, based on those interdependencies, to classify their attributes.

Keywords. Librarian as educator; information literacy; professional standards; factor analysis; curriculum

1. Introduction

The article discusses possibilities of research of study programmes aimed at preparing professional librarians. Its purpose is to test research methodology, allowing determining whether study programmes aimed at preparing professional librarians produce the entirety of competencies necessary for librarians as educators.

In the first part of the article, analysis of other studies of study programmes aimed at preparing professional librarians will be performed. The aim of

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analysis was to choose and form the research methodology. It was established that between 1990 and 2011 twelve different studies were designed to assess how many programmes were intended to prepare future professional librarians also provided emphasis on training that would allow them engagement in educational activities. The relevancy of research methodology was measured by evaluating the comprehensiveness of answers to a key question: „Is a particular study program intended to train professional librarians, also prepare them to engage in educational activities?"

In the second part of the article the strengths and weaknesses, performance techniques and procedures of content analysis are discussed. Also discussed were the methods of secondary data analysis. Factor analysis was chosen for secondary data analysis. Factor analysis is a type of multidimensional statistical scaling usually applied to determine interdependencies between the research objects or, based on those interdependencies, classification of research object attributes.

In the third part of the article methodology of the analysis is formulated. The components of study programmes have been analyzed following the *Standards for Proficiencies for Instruction Librarians and Coordinators*. Research evaluated the conformity of components to criteria for the *Standards* according to a scale of three levels – conforms, conforms in part and does not conform. Each criterion of the *Standard* was provided with a keyword. The correspondence between a component and the criterion of the *Standard* was evaluated according to the match between keywords and components. Secondary data analysis employed factor analysis. Distribution of factor estimates for and between every study programme has been evaluated by using box plot diagrams and by calculating the median and the mean of the factor estimates. The study used components of the three Lithuanian institutions of tertiary education that provide study programmes designed for training professional librarians.

This is the first attempt to assess research methodology for analyzing study programmes intended for training future professional librarians by means of a holistic approach: research used all subjects of the study programmes (not only those which are directly related with information literacy or bibliographic instruction, etc.), the analysis was performed in accordance with standards for instruction for librarians. The underlying concept of the research method was to carry out objective analysis of data provided by subjective means of research, giving as objective results as possible.

2. Analysis of prior study programme research

One of the ways to measure the librarians' potential preparedness to implement educational activities is to analyze the study programmes intended for training professional librarians. In the period from 1990 to 2011 12 different studies were devoted to measuring how deeply study programmes aimed at preparing professional librarians were taking librarian training for educational activities into account.

In this chapter the methodology of these studies will be analyzed. No attention was given to results, samples or context of the researches. The methodology of the researches was measured by how comprehensively the following key question was answered: „Is a particular study program intended to train professional librarians, also prepare them to engage in educational activities?“

Shonrock and Craig (1993) and Fabian and Westbrock (2010) implemented a survey of professional librarians. Shonrock and Craig (1993) conducted a survey, formulated on the basis of standards *Core and Advanced Competencies for Library Instructors & Coordinators* (Core, 1985) developed by the American Library Association in 1985. Fabian and Westbrock (2010) conducted a survey, formulated on the basis of *Standards and Proficiencies for Instruction Librarians and Coordinators* (The Standards, 2007) developed by the American Library Association in 2007. Both researchers asked respondents to assess which skills mentioned in the standards should be developed during the librarianship studies. According to the survey results, it is possible to measure what skills are not developed during the studies. The advantage of this type of research is its ability to assess study programmes as a whole. Another advantage: the survey is formulated in accordance with generally accepted standards. Deficiencies of the study: the research results are based on opinion of the graduates; also the problem that the graduates finished education at different times and thus were reporting on different things. A very high level of subjectivity and data inaccuracy remains in this type of research.

Sullivan (1996) and Borup (2005) conducted a survey of librarianship study programme coordinators. They asked the coordinators whether subjects for developing teaching skills were included in the programme. Advantages of such kind of research: accurate research data, because surveyed staff was responsible for study programmes development. Deficiencies of the study: data of the survey estimate only separate subjects, making impossible to evaluate study programme as a whole.

Estrin (1998), Julien (2004), Johnson et al. (2008), Mbabu (2008) and Edwards (2009) conducted a content analysis of study programmes intended for training professional librarians. They examined whether subjects for developing teaching skills were included in the programme. Advantages of this type of research: it has identified specific subjects and its content. Deficiencies of the study: the data of the survey estimate only separate subjects making it impossible to evaluate study programmes as a whole.

Pappert (2005) conducted the content analysis of study programmes aimed at preparing professional librarians. She examined whether in to the programmes are included subjects for developing teaching abilities. She evaluated the subjects for developing teaching abilities according to a predefined set of skills (criteria) that are necessary for librarians engaged in information literacy education. Advantages of such kind of research: were identified specific issues, their titles and content. The content of subjects was assessed accordingly to criteria. Deficiencies of the study: data of the survey estimate only separate out

subjects, making it impossible to evaluate program as a whole. It was chosen very specific and widely unknown criteria.

Johnson (2008) conducted content analysis of study programmes aimed at preparing professional librarians. He examined whether subjects for developing teaching abilities were included in the programmes. The examination was based on *Standards and Proficiencies for Instruction Librarians and Coordinators*. Advantages: it identified specific subjects and their content. Content of the subjects was analyzed in accordance with generally accepted standards. Disadvantages: data of the survey assesses specific subjects only, making it impossible to evaluate the program as a whole.

McGuinness (2009) conducted a survey of librarians. She asked whether they have received the necessary skills to engage in educational activities during librarianship studies. Advantages: the data reflects the study programme as a whole. Disadvantages: the research results are based on the opinion of graduates; the graduates graduated at different times. Such studies retain a high level of subjectivity and data inaccuracy.

In summary, none of the study methodology used up to now gives a comprehensive answer to the key question: „Is a particular study program intended to train professional librarians, also prepare them to engage in educational activities?“. The methodology of Shonrock and Craig (1993), Fabian and Westbrock (2010) and Johnson (2008) studies can give the most comprehensive response to the key question, but only a combination of those three research methodologies can give the necessary result. This kind of combined methodology would involve content analysis of librarianship study programme curriculum based on generally accepted standards that define the skills necessary for librarians to engage in teaching activities.

3. Content analysis as a method suitable for study programme research

Content analysis is relatively rarely used in social science research as it is time-consuming when compared to the survey method. However, the method of content analysis is characterized by its completeness and accuracy.

Content analysis is an “Analysis of the manifest and latent content of a body of communicated material (as a book or film) through a classification, tabulation, and evaluation of its key symbols and themes in order to ascertain the it’s meaning and probable effect” (Merriam, 2012). Content analysis signifies systematic reduction of any text or other data to statistically processed characters (Text, 1997). According to Morkevičius (2005, p. 76) quantitative content analysis differ from the daily reading, listening and monitoring because of a systematic, standardized and scientific approach.

The performance of content analysis can be based on both a qualitative and a quantitative approach. According to Morkevičius (2005, p. 75), the quantitative approach is usually based on clearly and directly measurable indicators and their further calculation. On the other hand, the qualitative approach is based on qualitative categories, which need not be directly measured in any way (it is enough to be perceived by the human mind), and later it can be classified and

translated into the form of various types of networks. The difference between qualitative and quantitative content analysis is artificial. In quantitative content analysis the data is evaluated qualitatively at first, and only then, on the basis of the investigation will the researcher choose some kind of quantitative access.

In social sciences content analysis is not a popular method. According to Morkevičius (2005, p. 77), it can be noted that a number of textbooks about research methods much less attention is given to quantitative content analysis than, say, to those of survey, observation or experiment. The main factors of the unattractiveness of content analysis for the scientist has been relatively limited applicability for a number of common research purposes, and most usually it was used only in communication studies and is relatively expensive, time consuming and complex to perform (Morkevičius, 2005, p. 76).

Berelson has identified seven cases (Berelson, 1952), when content analysis is worth using:

- When highly accurate and precise results are necessary;
- When objective results are necessary;
- When tested material reliably reflects the analysis;
- When there is a huge amount of data that cannot be otherwise treated;
- When a high level of particularity of the categories is possible and necessary (or desirable) ;
- When terms of the study are appear relatively frequently in the text;
- When there is a need to search for a relationship between communication content and statistical data unrelated to the content.

According to Krippendorff (2009, p. 350), the reliability of the data in quantitative content analysis is important. This aspect of reliability can be seen in two ways. One of the ways is measurement theory, which is based on models how mechanical measuring instruments function. According to this, reliability means that a method of generating the data is free from influences by extraneous circumstances that are extraneous to processes of observation, description or measurement.

Another method of data validation is the theory of interpretation. It is based on the fact that members of a scientific community agree on a certain way of talking about the same phenomena that their data are about something agreeably real, not fictional. Unlike measurement theory, interpretation theory acknowledges that researchers may have diverse backgrounds, interests, and theoretical perspectives, which lead them to interpret data differently. Different interpretation of the same data does not necessary mean an error.

Krippendorff (2009, p. 351) believes, that when data are taken as evidence of phenomena that are independent of a researcher`s involvement – for example, historical events, mass media effects, of statistical facts – unreliability becomes manifest in the inability to triangulate diverse claims, ultimately resulting in irreconcilable differences among researches as to what their data mean.

During the process of quantitative content analysis raw data is obtained – some amount of structured data. There is a need to reanalyze data. According to Heaton (2004, p. 47) in performing secondary analysis two or more data sets are combined for a broader comparative analysis of the phenomenon. Heaton (2004,

p. 89) suggested systematic procedures for secondary evaluation of content analysis data. Firstly, data set selection. Secondly, the data is analyzed: data is reviewed, and, if necessary, recoded. Thirdly, the possibility to implement qualitative research is measured. Fourthly, a summary is written.

According to Heaton (2004, p. 93), before starting secondary analysis of the data it is necessary to take into account the aspect of accessibility (accessibility of data sets), the quality aspect (data are full, the primal study was carried out properly), the eligibility aspect (data of primal study are suitable for secondary analysis and are up to date).

It is possible to do secondary analysis after evaluating the accessibility, quality and eligibility aspects of primary data. Important aspects for this are that data sets would be freely available, complete, and for the original study to have been carried out correctly and the data is not out of order.

For analysis of secondary data methods of statistical analysis can be used. For qualitative analysis of data these methods of statistical analysis can be used: contingency tables, questionnaire reliability assessment, factor analysis, binary logistic regression, and decision trees (Pukėnas, 2009, p. 4).

The goal of secondary data analysis is to structure primary data (to make it more acceptable for drawing conclusions) and to compare results of different study programme research items. In order to select an appropriate statistical method for primal data analysis we will perform a review of statistical analysis methods.

Contingency tables are used for the purpose of evaluating how one variable is related to another variable (Garson, 2009). In research of study programmes contingency tables could be adapted to assess the criteria correlation. For instance, how the first criterion is related to the second or third one. This method is not appropriate to compare study programs as wholes.

Reliability of the questionnaire is understood as the correlation between the obtained test results and hypothetical (axiomatic) results (Norušis, 2005; Garson, 2009). When it is impossible to get axiomatic results, to achieve reliability the questionnaire can be measured by these basic characteristics: internal scale consistency, test-retest reliability and inter-rater reliability. Assessment of questionnaire scale internal consistency shows that it is an appropriate method for evaluating of professional standard suitability for implementing analysis of study programmes. Assessment of the scale of internal consistency of questionnaires is based on the correlation of separate questionnaire questions and measures which questions adequately reflect the sample size and clarify the number of questions in questionnaire.

The task of factor analysis (Čekanavičius, Murauskas, 2002; Garson, 2009), is to divide observed variables into groups united by a factor which is not observed directly. Factor analysis divides variables into groups by correlation between them. Factor analysis helps to create smaller group of variables. It helps to concentrate information, to make it more catered. Factor analysis is a suitable method for summarizing the array of data in to smaller number of criteria. A reduced number of criteria allow easier comparison of study programs.

The method of binary logistic regression (Čekanavičius, Murauskas, 2002) is used for binary dependent variables. The binary variables are typically an event that may or may not happen. By using binary logistic regression can be calculated probability of the event on conditional independent variables. The data of study programmes analysis is not suitable for application of binary logistic regression, because regression analysis uses data sets formed by a yes/no principle.

Statistical analysis method decision trees enable to classify available data into groups and help to predict the dependent variables according to known independent variables. The structure of the analysis of study programmes determines that it is not necessary to predict the formation of groups. Results of study programmes analysis must be seen as they are, not what could potentially be.

In summary, analysis of study programmes meets all seven criteria of quantitative analysis identified by Berelson. Quantitative analysis helps to answer the key question because accurate and objective results can be drawn directly from content (study programmes), eliminate the intermediary (for instance, librarianship students) and reduce the noise of analysis as much as possible (because of direct observation). Taking this into account, it can be said that the statistical method of content analysis is suitable to implement analysis of qualitative data of study programmes.

The research of study programmes is based on professional standards. Implement study programme analysis based on professional standards is difficult for several reasons. Firstly, the programs consist of several dozen different subjects. Subjects are assessed in accordance with professional standards, which consist of 12 criteria. Of course, such amount of qualitative data can be processed by using other methods, but content analysis allows a very deep and structured analysis. This method of analysis also allows implementing comparative data analysis across different studies of training programmes. This study will perform comparative data analysis of three different study programmes. Analysis of study programmes requires a very high level of detail. It is necessary to clearly specify each criterion of professional standards in order to distinguish one from another. The reliability aspect of qualitative analysis is ascertained by clearly defining the evaluation criteria for study programmes. The interpretation aspect of qualitative analysis is implemented by using generally accepted professional standards, which are reformulated into the evaluation criteria used in this study.

4. Research methodology of study programmes for training professional librarians

Research methodology of study programmes aimed at preparing professional librarians is created to find the answer to the key question: „Is a particular study program intended to train professional librarians, also prepare them to engage in educational activities?“

Three study programmes of Lithuanian institutions that train professional librarians were analyzed:

- Vilnius University. The study programme "Librarianship and Information", approved in 2008 (hereinafter referred to as VU);
- Klaipėda University. The study programme "Informology", approved in 2010 (KU);
- Šiauliai State College. The study programme "Library and information resources management", approved in 2007 (SSC).

In annotations of all three study programmes there is no mention that students would gain knowledge or skills related to the development of educational activities. Only in KU study programme a subject is included, which is designed to develop future librarians' information literacy skills. In the VU and SSC study programmes no subject developed specifically to develop the ability to implement information literacy skills activities. However, some aspects of the requirements of professional standards are reflected in other subjects, such as Lectology, Communication Psychology and so on. In order to fully explore the study programmes relevance to professional standards, all subjects which are presented in class with a lecturer were analyzed.

Standards for Proficiencies for Instruction of Librarians and Coordinators have not yet been used in similar research. The standards are prepared for research use in this study itself. At first the *Standards* were translated into Lithuanian language. I need to mention that study was originally written and implemented in Lithuanian. An independent translator translated the *Standards* back into English language. Such kind of a retranslation was necessary to evaluating the accuracy of translation from English to Lithuanian language. If in retranslation of standards some essential discrepancies were found, that would have been a reason to review and reassess the translation from English to Lithuanian. Essential discrepancies would have meant that the meaning of the standards was not accurately conveyed.

No essential differences in retranslation from Lithuanian into English and the original version of the *Standards* were observed, despite several differences of style. These few minor differences did not distort the meaning of the standards. The standards consist of 12 criteria:

- **Administrative skills** (includes the ability to present a report given about the objectives of a training program, the ability to work in a team, collect and provide statistics and other information about training);
- **Assessment and evaluation skills** (includes the ability to create evaluation systems and to use the gained information so gained for development of training activities);
- **Communication skills** (includes the ability to adapt communication styles and methods to teaching styles, to conduct discussions, to help students study by various means both in class and outside it, to respond to colleagues' comments about the style of communication);
- **Curriculum knowledge skills** (includes the ability to analyze study programmes, identify courses and programs appropriate for teaching, to ensure that students use the library to perform training tasks);

- **Information literacy integration skills** (includes the ability to describe the importance of information literacy to faculty, leaders of study programmes, to collaborate with faculty integrating information literacy into study programmes);
- **Instruction design skills** (includes the ability to properly prepare a plan of lectures and seminars, to develop a learner-centered environment and to add tasks directly related to learning outcomes, to help learners to evaluate their need for information, select and evaluate sources of information, adapt training material depending on the available time for training and students' motivation to learn, their cognitive abilities, to use information technologies in teaching process);
- **Leadership skills** (includes the ability to use all opportunities to provide training in a library, educational institution or other organization, to encourage librarians and teachers to share ideas and participate in discussions of the teaching process);
- **Planning skills** (includes the ability to plan content of teaching material in advance and to plan teaching preparations);
- **Presentation skills** (includes the ability to use non-verbal means of communication during teaching, to customize training material and tools to the learners' needs, to clarify complex terms, avoid jargon, to use dictionaries in accordance with the learners' level, to rehearse the presentation of teaching content until self-reliance in the class-room can be achieved);
- **Promotion skills** (includes the ability to promote library instruction opportunities to new faculty, insufficiently involved departments and programs, to establish and maintain a working relationship with assigned academic departments and programs, to represent the library and the instruction program in regional, national meetings and conferences);
- **Subject expertise** (includes the ability to main knowledge of current basic precepts, theories, methodologies, and topics in assigned and related subject areas and to incorporate those ideas when planning instruction, to identify core primary and secondary sources within a subject area or related disciplines and promotes the use of those resources through instruction, to use an appropriate vocabulary for the subject and related disciplines in the class-room);
- **Teaching skills** (includes the ability to create a learning-centered teaching environment, to modify teaching methods and delivery to address different learning styles, abilities, developmental skills, participate in constructive student-teacher exchanges, modifies teaching methods to match the class style and setting, encourage teaching faculty during the class to participate in discussion, to link library instruction content to course content, to reflect on practice in order to improve teaching skills, share teaching skills and knowledge with other instructional staff.

Standards have been adapted to carry out research of study programmes according to a three-level rating scale: 3 - conforms, 2 – conforms partly, 1 –

does not conform. If the content of the subject fully fit the criterion, then the evaluation was 3 (conforms). If the content of the subject partly coincided with the criterion (subject text has at least some keywords which reflect criteria), then the evaluation was 2 (conforms partly). If the content of the subject did not coincide with the aspect described by the criterion (did not match any criteria reflecting keywords), then the evaluation was 1 (does not conform).

Nine subjects of the "Library information resources management" study programme, four subjects of the "Informology" study programme and three subjects of the "Librarianship and Information" study programme which were related with professional practice, preparation of thesis or physical education were not included in this study due to lack of relevance.

In order to evaluate the optimality of research structure of study programmes rank variable correlation coefficients were calculated. Kendall's tau-b coefficient calculation method was used.

Factor analysis was used to investigate the structure of the variables. Factor analysis was based on the correlation matrix. The correlation matrix itself was formed by use of the Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett's test of Sphericity significance level (Sig.). Factor coefficients were calculated after rotation. Rotation was performed by means of Varimax along with the Kaiser Normalization method. The Kruskal-Wallis test was used to determine the differences between the factors. The factor estimate of study programme distribution was assessed by use of box plot diagrams and factor estimate medians and means.

Statistical analyzes were performed using the SPSS 19 licensed program.

5. Evaluation of research result reliability and factor formulation

Rank variable correlation coefficients were calculated. Kendall`s tau-b coefficient calculation method was used. There are no statistically significant negative correlations in the intercorrelation matrix. This indicates that there are no certain criteria which are mutually exclusive. Most of the positive correlation is significantly above zero. Calculation of correlation coefficients showed which structure of evaluation criteria is optimal, because the criteria reflect different aspects of the research of study programmes. There is a statistically significant correlation between the criteria for „Planning skills" and "Presentation skills" ($r = 0.916$). This means that the results of these criteria are very similar, reflecting closely related sets of skills. Their connection is logical – delivery is associated with planning. However, these two criteria indicate different aspects, thus removing one of the criteria is not possible.

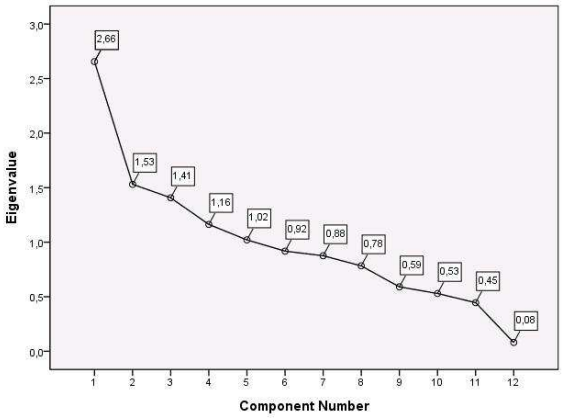
To investigate the structure of variables factor analysis was used. Factor analysis was used in order to divide 12 criteria into the wider group-factors. Factor analysis was based on the correlation matrix. Factor rotation was done by means of Varimax and the Kaiser Normalization method. Factor analysis reveals the strength of statistical correlation between several features and allows highlighting of hidden signs, patterns of causality and interdependence (Field, 2000).

The Kaiser-Meyer-Olkin (KMO) coefficient shows how the correlation matrix can be applied for factor analysis. The correlation matrix is more suitable for factor analysis when the KMO coefficient is closer to 1. When the KMO is lower than 0.5, factor analysis is not acceptable. The KMO coefficient of the study programmes correlation matrix research is greater than 0.5 and almost reaches 0.6 – the result is 0.597. The standards are suitable for factor analysis. The null hypothesis was that the correlation matrix is unitary – variables are unrelated to one another. The null hypothesis was rejected. Bartlett's Test of Sphericity significance level (Sig.) is 0.0001. This result along with the correlation matrix showed that variables are significantly related to each other.

We have found that five factors explain 64.8 percent of spread of all the variables. After the initial rotation of factors (the optimization of structure for maximizing the diffusion of factor weight), the first factor decreased from 22.129 percent to 18.043 percent and the second factor has decreased from 12.754 percent to 12.668 percent, the third increased from 11.725 percent to 12.562 percent, the fourth factor increased from 9.690 percent to 12.508 percent, the fifth – from 8.508 percent to 9.024 percent, but the overall portion of all variable spread explained by factors remained the same.

The factor eigenvalue diagram (see Figure 1) shows the eigenvalues. This allows deciding how many factors describe the data best. One of the options is to examine only those factors which have eigenvalues greater than 1. In this case, the following five factors should be studied, since their eigenvalues are greater than 1 (see Figure 1). Factors which have an eigenvalue greater than 1 imply that there is at least one unknown value, which can be described in a relatively large dispersion of all the variables.

Figure 1. Factor eigenvalues



In table 1 the matrix of rotated criteria is presented as coefficients of five factors after rotation. The Varimax rotation along with the Kaiser Normalization method was used for rotation purposes. Rotation of factors was done so that the lowest results of variable correlation which were not rotated would drop, while the highest would increase.

Table 1. Matrix of rotated criteria

	Factors				
	1. Presentation preparation and delivery skills	2. Content creation skills	3. Leadership and communication skills	4. Educational activity development skills	5. Analytical skills
Planning skills	**,948**	,126			
Presentation skills	**,948**	,111			
Subject expertise skills		**,817**			
Instruction design skills	,238	**,767**			-,113
Promotion skills	,135	,195	**,658**		-,136
Communication skills		-,128	**,594**	,195	
Leadership skills	-,132		**,552**	-,169	,292
Administrative skills	,506		**,513**	,164	
Information literacy integration skills		,122		**,839**	
Teaching skills				**,833**	
Curriculum knowledge skills		-,173	-,147		**,851**
Assessment and evaluation skills	,118	,355	,339		**,484**

Factors are described by importance (see Table 1).

The first factor correlates with the criteria that are generally characterized as a "Presentation preparation and delivery skills" (explains 22.12 percent of variable dispersion), which consists of two criteria: "Planning skills" and "Presentation skills". These two criteria are closely related, because they reflect a complex process – the creation and presentation of content. The fact that these two criteria are joined by the same factor is plausible. Although it should be noted that the criterion of "Administrative skills" is relatively highly correlated with the first factor (r = 0.506).

The second factor correlates with the criteria which stand for „Content creation skills" (explains 12.7 percent of variable dispersion), which consists of two criteria: „Curriculum knowledge skills" and „Instructional design skills". These two criteria are combined into a single factor, because subject development is closely related to the matter of subject knowledge and ability to

apply knowledge developing content in a given context and for a particular audience.

There are no doubts regarding the third factor. The third factor we call "Leadership and communication skills" (explains 11.7 percent of variable dispersion), which consists of four criteria: "Promotion skills", "Communication skills", "Leadership skills" and "Administrative skills". The contents of the third factor are linked by a common denominator – communication and leadership skills.

The fourth factor, "Educational activity development skills" (explains 9.6 percent of variable dispersion), which connects the criteria of "Information literacy integration skills" and "Teaching skills". The fourth factor is linked by a common denominator – educational activity development skills.

The fifth factor, „Analytical skills" (explains 8.5 percent of variables dispersion) connects the criteria "Curriculum knowledge skills" and "Assessment and evaluation skills". These abilities are linked by a common denominator – analytical skills.

Factor analysis forms a theoretically meaningful structure of variables. It can be reasonably stated that the criteria are suitable to analyze how the study programmes correspond with standards defining the skills of librarian as educator.

The Kruskal-Wallis test was used to identify of differences between the factors. A $p < 0.05$ significance threshold was selected. It was formulated by a null hypothesis that the mean between factors do not differ. Null hypothesis was denied – all factor means significantly differ: "Presentation preparation and delivery skills ($p < 0.000$)", "Content creation skills" ($p < 0.001$), "Leadership and communication skills" ($p < 0.048$); "Educational activity development skills" ($p < 0.002$), "Analytical skills" ($p < 0.000$).

6. Professional librarian study programme compliance with the key question:

Result discussion:

1. study programmes fit to criteria was measured – by a common factor mean, distinguishing maximum and minimum compliance;
2. factor spread by study programme was discussed – an estimate provided by analyzing the median and box plot diagrams.

Study programme compliance with standards

Study programmes were evaluated by means of a three level grading scale, where 3 means "conforms", 2 means "conforms partly", and 1 – "does not conform" *Standards for Proficiencies for Instruction Librarians and Coordinators.* In this case, the lowest possible average of the unit is one, while the highest – three. Number one would mean that subjects do not meet any criteria. Numbers greater than one indicate that some of the subjects meet the standards. The higher a number is above one, the more subjects of study programme meet the standards.

It can be argued that the study programmes are partly consistent with all the criteria of *Standards for Proficiencies for Instruction Librarians and*

Coordinators, because means of all relevant factors are greater than one. Factor estimates indicate that the highest mean is "Presentation and delivery skills" (overall mean 1.6159). The following are "Analytical skills" (1.5364), "Content creation skills" (1.4636), "Leadership and communication skills" (1.4056), "Educational activity development skills" (1.3013).

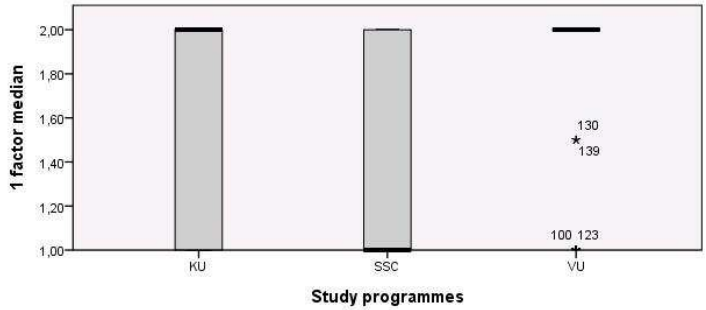
In summary, noting the way study programs fit the standards, it can be assumed that future librarians would be at least partially prepared to teach information literacy courses because study programmes for training professional librarians have "Planning and delivery skills", "Curriculum knowledge" and "Planning skills" as their foremost focus. However, there is a lack of skill for implementing information literacy information courses, because less attention was paid to promotion, communication, leadership and administrative skills. A general trend is also noted that graduates are lacking adequately prepared and effective course material that would provide knowledge and skills related to information literacy, because little attention is paid to the integration of information literacy, teaching, curriculum knowledge and skills outcomes assessment into the curricula. It should be noted that graduates will have little knowledge in information literacy teaching methods. It confirmed the null hypothesis that in the training programmes aimed at preparing professional librarians little attention was paid to educational activities.

Comparison of factor estimate spread by study programme

For discussion of the study programme research results box plot diagrams were. Box plot diagram help to identify results' nucleus, dispersion, and an easily accessible visual representation of maximum and minimum values (Field, 2000). With the box plot diagram it is possible to identify more accurate results for comparison of study programmes. In discussing the results, a median of 1.5 was chosen as the threshold at which the result is considered to be positive, estimates of which are are dispersed by up to two. This means that more than half of the subjects completely or partly conform the criteria. In discussing the results ones most representative of the factor in question were sought to be discerned.

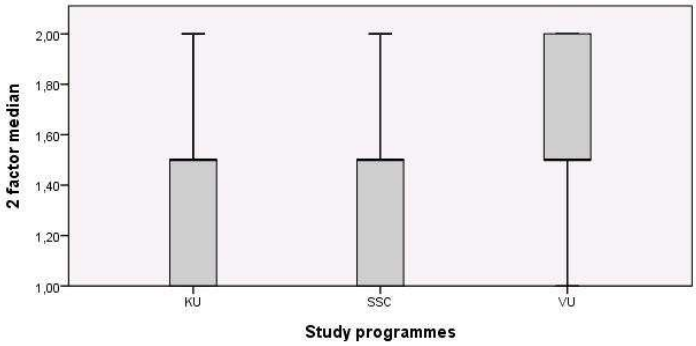
The median of the factor "Presentation preparation and delivery skills" are 2 for KU, 1 for SSC, 2 for VU (see diagram no. 2). It can be argued that this factor is best reflected the in VU study programme. While the KU median is the same as that of VU, the VU variables are more closely aggregated around the value of 2, while KU variables aggregate more towards the value of 1 (gray bar marks the spread). This means that faculty of the VU study programme highlight the ability to create presentation content and prepare its delivery most among the study programs. A lot of focus is also placed on public speaking, presentation delivery, adaptive communication, language culture skill in the VU study programme. Outliers (values most remote from the data center) are marked as asterisk and ball in the diagram.

Diagram 2. „Presentation preparation and delivery skills“



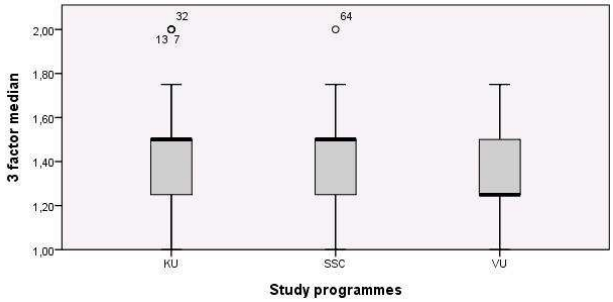
The medians of the second factor of “Content creation skills” is 1.5 for KU, 1.5 for SSC, and 1.5 for VU (see diagram no. 3). It can be argued that the factor “Content creation skills” is reflected mostly in the VU study programme. While all three study programme medians are the same, but VU variable estimates are distributed between 1.5 and 2, while KU and SSC variable estimates are distributed from 1.5 toward 1. This means that VU faculty puts more emphasis on lifelong learning, analysis and practical application of theories, develops information search, information resources creation information need identification skills, develop an appropriate use of terminology of relevant subjects.

Diagram 3. „Content creation skills“



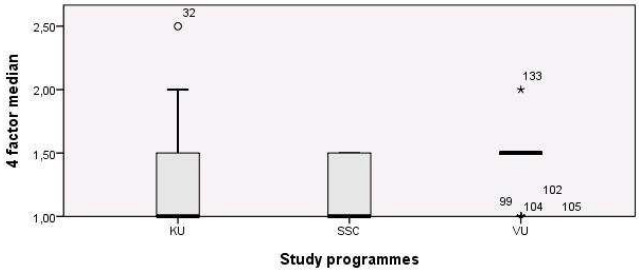
The median of the third factor, “Leadership and communication skills” for KU is 1.5, SSC – 1.5, and VU – 1.25 (see diagram no. 4). It can be argued that this factor is reflected best in the SSC study programme. KU variables estimated distribution is between 1.5 and 1.25. SCC data shows notably similar results – the median is 1.5, while estimates of variables are spread from 1.5 towards 1.25. But in the case of SSC values are less remote from the center position of data. This means that the SSC study programme faculty emphasizes such subjects as advertising, public relations; develop their professional, group, interpersonal and organizational communication, argumentation and discussion skills, leadership, teamwork, as well as the ability to prepare reports.

Diagram 4. „Leadership and communication skills“



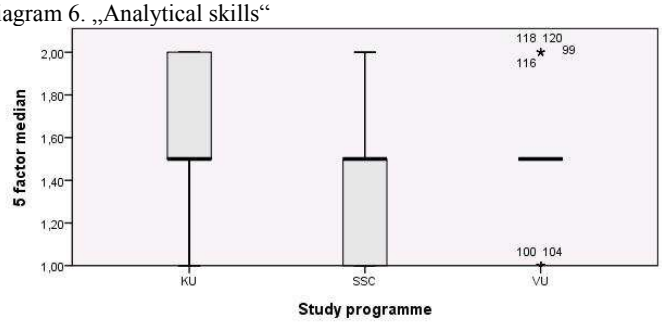
The medians of the fourth factor “Educational activities development skills” are 1 for KU, 1 for SSC, and 1 for VU (see diagram no. 5). It can be argued that this factor is reflected best in the VU study programme. This means that the VU faculty emphasizes features of a teaching/learning methodology, introduces the principles of information literacy and organization of study processes in higher education.

Diagram 5. „Educational activity development skill“



The KU median of fifth “Analytical Skills” factor is 1.5, SSC – 1.5, and VU – 1.5 (see diagram no. 6). It can be argued that the factor is best reflected in the KU study programme. KU variable estimates are distributed from 1.5 towards 2, while the SSC variables estimates are scattered toward 1, and VU variable estimates are distributed around the median. This means that KU faculty puts more emphasis on education for subject-matter analysis, problem-oriented analysis and evaluation skills, and the ability to adapt the results of evaluation in practice.

Diagram 6. „Analytical skills“



In summary, the VU study programme differs from other study programmes by emphasis on the factors of "Presentation preparation and delivery skills", "Content creation skills" and "Educational activity development skills", for which the median are higher than the median of SSC and KU. It is also must be noted that the VU study programme is exceptional in that the factor "Leadership and communication skills" is the lowest median in comparison with other study programmes. This data indicates that VU study programme students are the most prepared to implement information literacy training – to create training content and lay it down by a well-designed and planned presentation, but they lack the skills to promote information literacy training or share knowledge with colleagues.

The KU study programme can be distinguished by the factor "Analytical skills", the median of which is higher that VU and SSC. The highest factor median of KU is "Presentation preparation and presentation skills", "Leadership and communication skills", and "Analytical skills". However, the median of the "Educational activity development skills" factor is much lower than of other factors. This indicates that KU study program students are more willing to promote, evaluate information literacy activities, to discuss achievements and failures than to implement educational activities (to teach).

The SSC study programme is distinguished by the factor "Leadership and communication skills" the median of which is higher than that of VU and KU. The highest SSC median is that of the factors "Content creation skills", "Leadership and communication skills" and "Analytical skills". However, the median of factor "Educational activity development skills" is much lower than that of other factors. This suggests that SSC study programme students are better prepared to plan and prepare materials for training, promotion, implement information literacy activities evaluation, to discuss the achievements and failures than to implement educational activities (to teach).

The VU study programme meets the standards better than SSC and KU. The SSC study programme meets the standards at least. There are more similarities between KU and SSC that between VU and KU or VU and SSC. In this context, the VU study programme is the most different; its content is the least similar to both the KU and the SSC study programmes. It can be argued that the KU and SSC content is similar in that they develop similar abilities.

7. Conclusion

Analysis of other research of study programmes for professional librarian training demonstrated that the best method for analyzing study programmes is content analysis. Content analysis is the most suitable method for finding the answer to the key question: "Is a study programme aimed at training professional librarians also preparing them to engage in educational activities?". The analysis showed that content analysis must be done by employing specific criteria. For that purpose the *Standards for Proficiencies for Instruction of Librarians and Coordinators* were used. Professional standards may serve as a essential tool for training librarians as educators because they may be put to use for dual evaluation: by librarians, in self-assessment of the their preparedness to

work as educators, or by study coordinators, in determining advantages and disadvantages of a study programme intended for training librarians as educators. This study showed the possibilities for advantage and disadvantage research of study programmes for training librarians as educators.

Factor analysis and box plot diagrams were chosen for secondary analysis. Analysis of other secondary data analysis methods showed that factor analysis is the most suitable among them for analyzing a large quantity of data when there is a demand for comparison of different study programmes.

The study is interesting in two aspects: a) it makes use of the standards defining the entirety of competencies necessary for a librarian as an educator, as developed by the professional librarian community; b) the study's data analysis employed factor analysis.

The study proved that the *Standards for Proficiencies for Instruction Librarians and Coordinators* and factor analysis may provide an appropriate method for the assessment of study programmes designed for preparing future professional librarians, i.e., in evaluating whether the competencies developed under a study programme correspond to the entirety of the competencies peculiar to librarians as educators. It should be pointed out that factor analysis is a particularly useful statistical method for conducting similar research when the data is collected following several dozens of criteria and for comparing the results between the three study programmes. Distribution of the factor estimates across the study programmes has been evaluated by using box plot diagrams and by calculating the median and the mean of factor estimates.

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