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Should Math Tools and Quantitative Methods be Part of University-based Translator and Interpreter's Training? Russian Graduates' Voices in the Focus

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ABSTRACT

The current importance of the research stems from the fact it identifies the reasons regarding translators' and interpreters' attitudes towards math tools and methods in their training program curriculum, and there has been no previous research on the topic. Another point to be mentioned in this regard is that research data and findings contribute to the overall significance of reliability, validity, and objectivity of the measurement and interpretation of the data within the landscape of multifaceted Humanities studies in general, and theoretical and applied aspects of professional activities in the field of Translation and Interpretation, in particular. The goal of the research is to explore the attitudes to the above-mentioned tools and methods as part of academic curriculum regarding Russian graduates of Master's programs on Translation and Interpretation. The goal was reached through a number of steps, including the analysis of the MA programs on Translation and Interpretation curriculum within the international framework, the identification of general trends regarding graduates' perception and the study of those components that shape their attitudes. The research methodology combined theoretical studies, qualitative and quantitative types of analysis. The empirical data was collected through the survey of graduates of various Russian universities who were part of Academia or Industry related to Translation and Interpretation. Cluster, factor, discriminant types of analysis were implemented. The SPSS was used for data processing. The research results confirmed the hypothesis that graduates' attitudes to mathematical tools and methods in general and to the respective module inclusion in the University-based translator and interpreter' training in particular depend on the two following factors. First, it is quality of MA program students completed in terms of the program module/course on math tools and methods for translation studies and second, graduates' working requirements. The research significance derives from the confirmed importance of the curriculum that should integrate research, math tools, technology and employers'

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State of the literature

- Traditionally translator and interpreter's training focuses mostly on the applied fields related to the development of translation and interpretation skills and the use of digital technologies to speed up the process.
- Meanwhile university-based translator and interpreter's training should take into account the current Academia trend towards research led-curriculum. The above curriculum requires that students had adequate competence in using both qualitative and quantitative research methods.
- The research publications confirm that academics apply diverse math tools and methods in their T&I studies. Meanwhile most degree programs on T&I lack the consistent modules on the above tools and methods application to train students in the relevant field. The above situation limits T&I programs graduates' capacity to conduct research with use of math tools and methods that are internationally recognized instruments to foster objective and reliable research data and its processing.

Contribution of this paper to the literature

- The analysis of current MA programs on translation and interpretation specified the status of the relevant course or modules in the MA programs for translators and interpreters, confirms the lack of such courses in most programs advertised through the internet portals and suggests such a course should be consistently integrated in the university degree programs for translators and interpreters
- The survey of the graduates of the above programs who have three to five year long working experience helped to identify graduates' general attitudes to the math tools and methods in translation and interpreting studies and activities, and the mentioned audience' attitudes to the to the idea of math tools and methods course as part of their university program on translation and interpreting and reasons hereto.
- The research also revealed the degree of graduates' awareness of the above tools and methods use in translation and interpretation domain, the degree of their interest and experience in applying the mentioned tools and methods in the course of their professional activities, the current working requirements with regard to the above tools and methods application.

requirements. Moreover, the research specified the above curriculum particular requirements regarding translators and interpreters.

Keywords: math tools, quantitative methods, university-based translator, interpreter's training, graduates of master's programs, academic curriculum

INTRODUCTION

Current Importance of the Research

One of the key issues in research activities concerns quality assurance (Basak, 2006). The consistent, transparent and objective research methodology is crucial for obtaining reliable findings. Modern research rests on the long-standing tradition to integrate qualitative and quantitative methods into research of various fields of knowledge including language studies. Scholars underline the importance of using mathematic methods and statistic tools in Language Studies, the 21st century witnesses a solid development of Quantitative Linguistics (Köhler et al., 2005). Moreover, written and oral translation (interpretation) (further T&I) process becomes a subject to quantitative methods application, as well (Baker, 1995). Nonetheless, educators voice concerns about students' degree of competence in research methods design and application (ACME, 2011). The above proves the current importance of the research.

Research Problem Background

Digital environment that is speedily absorbing diverse aspects of contemporary society life lays pathways to aggregate considerable amounts of data that require statistic tools to interpret the figures. Quantitative analytical methods and statistic tools are viewed as reliable instruments for research in Science, nonetheless the state of affairs is different when it concerns Humanities (Wilcox, 1998). There are publications on quantitative methodology use in various branches, including Psychology, History, Linguistics, Translation Studies, etc. (Cao, Kurbanova & Salikhova, 2017; Sun, Varankina & Sadovaya, 2017; Luneeva & Zakirova, 2017; Gorev & Kalimullin, 2017; etc.). Yet the above methodology is still not a consistent part of studies in all the fields of research within the Humanities framework (Taylor & Lauren, 2015).

When trying to explore the reasons for the above situation its seems necessary to take into account the Academia and Industry practice and opinions on math tools and quantitative methods (further MTQM) as part of university- translators' training as there is often a gap between academic contents and industry requirements regarding T&I specialists' competences and skills (Kenny & Doherty, 2014). Thus, the questions related to the course on MTQM content within academic curriculum, the course concept as viewed by various stakeholders, including employers, teachers, students, deserve researchers' attention. Meanwhile, such kind of analysis has not become subject to complex studies so far.

The research sets forth the following questions:

- What is current state of affairs related to the application of MTQM in T&I research, academic studies, and T&I industry?
- What are general trends in the attitudes to the work with MTQM regarding Russian specialists who graduated from MA programs on T&I?
- What implications can be specified regarding the course / module on MTQM in academic curriculum?

The research hypothesis suggests that graduates' attitudes to MTQM in general and to the module inclusion in the University-based translator and interpreter' training largely depend on the two following factors: first, quality of MA program students graduated from in terms of the program module/course on MTQM in T&I research and second, graduates' working requirements.

Research Goal and Tasks

The research goal is to identify the graduates' attitudes to the MTQM as part of university-based academic programs.

Graduates are in the focus of research due to their two-fold status: once they were university students attending the course on MTQM in T&I studies, and further they have become employees in Academia and Industry entities who are able to evaluate the relevance of the offered course content through the lenses of T&I academic and market contexts.

The goal suggests a number of tasks were implemented.

First, the research includes the analysis of university MA programs on T&I trends regarding the course on MTQM in their curriculum.

Research Contribution to the Problem Studies

The research specified the current need for skills and competences in the field of MTQM for those who engage in T&I academic studies and professional practice. The analysis led to the understanding of the Academy trends in teaching MTQM to students of degree programs on T&I. The research findings provided systemic understanding of current situation regarding novice researchers and practitioners' attitude to mathematical tools and methods in the field of translation studies and industry. The analysis helped to identify those constitutive components that shape the graduates' attitude to MTQM. The results of the study made it possible to draft recommendations regarding the syllabus of the course on MTQM for students of degree programs.

METHODOLOGY

Research stages

The research combined desk and field studies, and integrated qualitative and quantitative methods of studies, as the mixed studies have proved their efficiency (Creswell, 2009).

The first stage focused on the relevant literature selection and review to clarify the current state of affairs with regard to the Academia's experience and trajectories in the application of math tools and quantitative methods in T&I studies.

The Academia recognizes that it is a master -level program that fully combines featured professional skills training and full-scale academic research abilities advance (Smith & Brown, 1995).

Thus, the next stage included comparative analysis of MA programs on T&I, filed on the mastersportal.eu. Currently there are 102 MA programs filed on T&I. The search through the above programs description and their courses syllabus was conducted to identify the module on math and statistic tools for MA studies on T&I and contents of the course, as well.

The next stage included two-stage survey to explore attitudes and perceptions of the target population, as this empirical method has proved its reliability and efficiency (Pöchhacker, 2009).

Research sample audience

The targeted sample for the present research covered graduates being part of MA programs that focus on translation and interpreting. The random sampling was used to distribute self-administered questionnaires through MA programs graduates of Russian Universities via internet forums and networks. Such channels as Facebook, Google+, ResearchGate were used to select sample audience.

In line with the research hypothesis and questions the following variables were used:

- age and working experience,
- gender,
- academic affiliation: respondents were asked to identify the status of institution (metropolitan/federal/regional/local academic institution),
- perception of the quality of MA program respondents completed in terms of the program module on quantitative methods in T&I research: Yes/No reply regarding the existence of such a module, the evaluation of the module quality ("excellent", "good", "satisfactory", "poor" level of the course with individual's comments if any),
- respondents' professional job activities as related or not related to T&I and quantitative tools: Yes/No reply with individual's comments if any),
- type of employer (small business entity, middle size company, recognized academic institution, large company).

The data collection procedure respected respondents' privacy and assured their anonymity.

Totally 231 graduates were selected with the aim of balanced distribution of characteristics that were considered as research variables. There were 52% female and 48 male respondents. Their age limits varied from 24 for 27 years, with working experience ranging from 3 to 5 years. As for the status of university the graduates were affiliated to, sampling had the following picture: 19% of the respondents were graduates of metropolitan universities. 21% belonged to universities that hold the status of federal academic institutions. 20% of survey participants graduated from regionally acknowledged institutions. 21% of those questioned studied at a small local university with a sustainable reputation of the MA program they were part of; and 19 % of the respondents revealed they studied at a small local university where the MA program on translation within the Linguistics education field was not well developed in terms of curriculum components.

The respondents' employment options included work as freelances (18%), job position in a small T&I firm (20%), work in a sustainable mid-size company dealing with translation and interpreting (21%), employment in a recognized academic institution (21%), managerial position in a company/academic institution dealing with T&I (20%).

Research survey

It was decided to conduct the pilot study to assure the validity and the reliability of the questionnaires, to check the wording of the questions with regard to their clearness, as the literature argues for the importance of such kind of activities prior to the official survey (Dehlberg & McCaig, 2010).

The graduates of RUDN MA programs on Legal Translation and on Translation and Interpreting for Public services (24 respondents) agreed to engage in the procedure. Their comments on the questionnaires content for the survey helped to polish its structure and procedure. The pilot questioning confirmed the suitability of running two-step survey, including open-ended and close-ended questionnaire, respectively.

The open-ended questionnaire was compiled to identify general trends in graduates' attitudes toward the issues under study.

The open-ended part of the questionnaire included two questions:

- What is your general attitude to the module on MTQM in the MA programs on T&I? (Positive/Negative, and Why?)
- Should MTQM be part of the curriculum of MA program on translation and interpreting (Yes/No, and Why?).

The pilot study helped to formulate the statements for the close-ended part of the survey.

The close-ended part of the questionnaire aimed to enhance the picture regarding the respondents' attitudes to the topics specified in the open-ended questionnaire. Respondents could also add their comments in the section "other opinion" if they considered it necessary.

The close-ended part of the survey included the following questions and options for the answers:

1. *How would you estimate your awareness of MTQM in T&I studies?*
   - I am not aware of MTQM in T&I studies
   - I heard about such methods but I did not deal with them
   - I took the course on the topic but I did not see its usefulness
   - I took the course on the topic and acquired further skills due to my work requirements
2. *Are you interested in academic research in T&I domain with MTQM application?*
   - I am not interested in MTQM application in T&I studies
   - I am interested in the topics in MTQM application but the MA program did not elaborate on the issue
   - I am interested in the topics in MTQM application in T&I studies but I need specific skills and not detailed theoretical background
   - I am interested in the topics but my job requirements do not relate to the subject under study
3. *What is your experience in MTQM application in T&I research?*
   - I have not got any experience in MTQM application in T&I studies as I did not want to deal with MTQM
   - I have not got any experience in MTQM application in T&I studies as the MA program that I enrolled in did not focus on such activities
   - I have got some experience in MTQM application in T&I studies while drafting my course/paper degree thesis but my current professional activities in Academia / Industry (underline the right option) do not require the use of the tools and methods in question

- I have got some experience in MTQM in T&I studies while drafting my course/paper degree thesis and I continue to apply the above tools and methods in my current professional activities within Academia and/ or Industry (underline the right option) settings.

4. *What are your working requirements with regard to MTQM application in T&I?*
   - My job is not concerned with MTQM application in T&I studies as I did not want to deal with MTQM
   - I work in academic research settings and my job requires the use of MTQM
   - I work in the field of translation industry and sometimes/often (underline the preferred option) I have to account for MTQM in T&I practice
   - My current job is not related to T&I research or practice though sometimes/often (underline the preferred option) I have to consider the data processed through MTQM in my professional activities.

The SPSS software was used to process the surveys data.

Descriptive statistics were used to identify the social and professional characteristics of the respondents.

Multivariate statistical methods (cluster, discriminant and factor analysis) and correlation analysis were applied to process the collected data. A cluster analysis was used to identify homogeneous groups of graduates regarding their attitudes to quantitative methodology and math tools integration in research activities within the MA program. A discriminant analysis profiled the above clusters in terms of those factors that specify the graduates´ attitudes to the issues under study. A factor analysis helped to determine a meaningful set of variables. The correlation coefficient was taken into account to measure the association between variables.

The Student t-test was applied to evaluate the differences significance.

LITERATURE REVIEW

There is an established and accepted understanding of Natural Language communication as subject to research with mathematic tools and statistical computing (R Core Team, 2015).

Scholars agree on the linguistics and mathematics interdisciplinary (Mickens, 1990) that is revealed in a number of language studies trends, including structuralism, conceptual metaphor theory. Researchers point out that "language and mathematics have similar structures, but different functions, even though one without the other would not exist (Danesi, 2016).

Scholars suggest the existence of mathematical entities indispensability in science due to their role in the scientific explanations of the world (Field, 1989). In relation to the present article research topic it seems necessary to highlight researchers' understanding of the fact that mathematics is part of translation activity due to these two fields common written-visual nature, symbolic contents behind these two systems signs, mutual dependence and reciprocal relations among the above signs inside the math and language systems (Sarukkai, 2001).

Mathematical and statistical techniques are known to form the grounds for quantitative methods that are used to analyze data in a variety of subject areas, including human language, communication, and behavior. The above lays grounds for mathematic tools use in translation field. The third Millennium views that it is common practice to use quantitative methods for research in translation and interpreting domain.

Moreover, scholars underline that translation research within empirical, experimental, and cognitive perspectives require quantitative methods to be integrated in translation studies (Amparo et al., 2015; Gile, 2016; Saldanha & O'Brien, 2014).

Moreover, current practice reveals that mathematic and statistic tools are used for research in both translation and interpreting sub settings.

Further the present paper tries to map those T&I research trends and spheres where math tools and methods have proved their application effect.

Academics use quantitative methods to explore different fields of T&I nature.

Some scholars consider the importance of statistic modelling to enhance assessment objective nature regarding interpreting self-efficacy scale in general (Lee, 2014).

Others underline the efficient use of quantitative analysis to investigate individual difference variables within the context of interpreting (Rosiers et al., 2011).

Researchers argue that the above tools can be particularly useful to explore translators' activity and process the aggregated data (Carl & Jakobsen 2009).

Statistical methods are applied to study difficulties in translation process (Sun & Shreve, 2014), and at editing and post-editing stages, as well (Carl et al., 2011, Kruger, 2012).

There is sufficient evidence that quantitative methods should be a systemic part of translation corpora studies. Researchers prove that clustering techniques can effectively help identify similarities existing in translational corpora (Shih-Wen Ke 2012).

Quantitative methods are applied to identify the scale of source material difficulty to avoid further errors (Liu & Yu-Hsien Chiu, 2009).

Comparative investigation of source and target text use machine-learning stylometric distance methods to study authorship attribution issues regarding the Source and Target text in translation (Rybicki, 2012).

The original data can be found regarding the application of concrete types of analysis in T&I studies.

Thus S. Gries and S. Wulff (2012) provide the methodology of applying regression analysis in translation studies. Particular emphasis is laid on the use of mathematics and statistics to identify the translation invariant and units that appear in the target text due to translator's background and the procedure specific settings. Thus, scholars apply discriminant analysis with various style markers to determine translation invariant characteristics (Patton & Can, 2012), combine factor analysis, principal component analysis, and correspondence analysis to study "interaction between translation-specific features, stylistic factors and affix use in translated English" (Jenset & McGillivray 2012). G. de Sutter, I. Delaere and K. Plevoets prove that profile-based correspondence analysis and logistic regression modeling enables us to determine the exact impact of the idiolects on the lexical choices in the course of translation (de Sutter et al 2012).

The mentioned publications reveal a diverse palette of ways to apply math tools and methods in T&I studies and confirm that these tools and methods under study have already become part of T&I studies practice. Nonetheless, it seems strange and even alarming that one of the first comprehensive publications considering and summarizing ways to use these tools in the field of T&I has come to light only in 2017 (Mellinger & Hanson, 2017).

The above leads to a thorough understanding of the importance of the courses on the quantitative methods within the university-based translator and interpreter training programs as their graduates are likely to combine translation practice and research activities.

Educators agree that translator training programs across the world respond to technology development (Belenkova & Davtyan, 2016), confirm the technological shift in translation practice and consequently in translator's training (Venuti, 2016). Meanwhile, regarding graduate-level translation and interpreting programs, scholars mention that such programs are traditionally housed in comparative literature programs and do not regularly incorporate quantitative research methods in their curricula, and opportunities for formal study using empirical methods are scarce" (Mellinger & Hanson, 2017).

In view of the above it seems up-to-date to study to what extent the above programs involve special disciplines that focus on methodology to conduct formal research through analyzing empirical data and its statistical processing and interpretation.

It is also important to explore the opinions and perceptions of the university graduates as once they were key stakeholders within the translator and interpreter training environment.

RESULTS AND DISCUSSION

MTQM module in the MA programs on T&I

The review of the university degree programs confirms the above statement. The analysis of the MA programs on Translation and Interpreting that are filed on the mastersportal.eu revealed the following. Among 102 programs filed on the portal (the certificate, and vocational courses were excluded from the investigation) 85 MA programs concern directly translation and interpreting issues (others combine translation and interpreting with TESOL, cross cultural communication, etc.). It should be noted that even if there is a course on methodology of research in Translation Studies, its content is often limited to the topics on the main research paradigms and orientations in Translation.

Only 13 university-based MA programs on Translation and Interpreting include special modules on research methodology (visit, for instance, the MA program in Translation at the university of Melbourne, Australia; The MA program in Translation Studies at Hamad bin Khalifa University, Qatar).

The course might go beyond 20 credits and covers such issues as identifying variables, selecting and analyzing kinds of data in Translation Studies, etc. (visit for instance, the MA Program at Polytechnic Institute of Bragança, Portugal, MA in Translation studies at Bangor University, UK). There are no country-related specifics in the above programs, in they are offered in Australia, Canada, Portugal, Qatar, Spain, the UK, the United Arab Emirates.

Traditionally courses on quantitative methods are related primarily to Linguistic Data Analysis and embedded in the degree programs in the above programs streams of General Linguistics/ Corpus and Empirical Linguistics (visit, for instance the MA program in Language Studies at the City University of Hong Kong, the MA program on Language Analysis and Processing at the University of Bibao, Spain).

Most MA programs in the domain under study strive primarily to respond to the translators' work industrialization. Due to this core modules courses focus on applied techniques, CAT tools, communication, finance and marketing issues with regard to translation profession, etc., (visit for example the MA program in Translation and Interpretation in Global Enterprises at Business, Marketing & Communication School, Spain; the MA Program on Business Translation and Interpreting at the University of Surrey, UK).

The latest data mentioned above confirm previously voiced concerns (Mellinger, Hanson 2017:xii) about the doubted consistency of modules on research methods in T&I studies in MA programs under study. It should be mentioned that in the Russian Federation all the MA programs on T&I are implemented within the Linguistics education field. There are the Federal Education Standards for MA programs within the above field (Russian Federal Standards for Higher Education Program on Linguistics, 2016), and the Standards require modules in the curriculum to train students on research methodology, including data collection, processing and interpretation on grounds of modern instrumental apparatus of theoretical and applied Linguistics.

It is not possible to state that each MA program on Translation and Interpreting in the Russian universities incorporates a detailed course on quantitative methods for T&I studies, though there is a long-standing tradition to include the course on Research Methodology for Language Studies in the above programs. As regards the authors' professional experience, the MA course on Legal Translation and MA course on Translating and Interpreting for Public Services and Institutions that are offered at Peoples' Friendship University of Russia include the module on research methodology in T&I studies. The course has been designed in line with the latest developments in the field and is subject to consistent renewal depending upon new emerging research publications on the topic. Nonetheless, the authors cannot state that all those involved in the education process are really happy with the course, the details and reasons for the mentioned situation will be further explained.

Graduates' attitudes to MTQM module in the MA programs on T&I

The survey first step included an open -ended questionnaire that revealed three major types of graduates' attitude.

24% of the respondents expressed their negative attitude; they mentioned no aptitude to such kind of research due to rather time-consuming and complicated procedure, lack of the relevant skills.

23% turned out to be neutral as they did not know about the topic or did not engage in work that would require the use of the mentioned tools and methods.

53% of the graduates underlined their positive attitude to the topic under study and mentioned that the quantitative methods helped to save time, foster reliability of the research findings, the use of the above methods is required by international research standards.

The above figures were not sensitive to graduates' age (p>0, 01), gender (p>0, 01), their university affiliation (p>0,02), working experience(P>0, 01), employers' type (p>0,01).

The discriminant analysis revealed as statistically significant graduate's job activities as related or not related to T&I (λ = 0,289, $\chi 2$ = 2,87, p <0,001), the quality of MA program course on MTQM as viewed by the respondents (λ = 0,317, $\chi 2$ = 2,48, p <0,002), type of employer (λ = 0,38, $\chi 2$ = 2,071, p <0,002).

Those who expressed their positive attitude to the MTQM in the MA program curriculum worked in serious companies that dealt with machine translation, various language corpuses creation or in recognized academic institutions, engaged in international academic cooperation, projects, and networking. This category of respondents also mentioned that they had a good module on MTQM during their MA studies.

Those who revealed their negative or neutral attitudes mentioned they had no course on MTQM during their MA studies, or it was poorly delivered and did not lead to any specific skills.

Moreover, these two groups of respondents combined work in a small firm with freelance activities in the field of translation and interpretation. They underlined no need for research skills regarding MTQM for those engaged in the respective professional contexts.

The second question of the open-ended questionnaire aimed to get the initial opinion of graduates on the topic whether MTQM should be part of the curriculum of MA program on translation and interpreting (Yes/No, and Why?).

24% of the respondents answered "no", saying this kind of expertise is required in a narrow field of "pure" research that does not deal with T&I and not in the T&I practice or general academic contexts. The previous negative characteristics related to time-consuming and complicated procedures were also mentioned.

48% of the respondents underlined that university-based modules on MTQM should be in the curriculum, but such a module should be practice-oriented and explained in plain language as students of MA on T&I do not have solid math background.

28% of those questioned responded in extremely positive way saying it is a must to have such a module in the curricular as it paves the way to further successful engagement in the academic career, networking, international cooperation, etc.

The above characteristics were not sensitive to graduates' age (p>0, 01), gender (p>0, 01), their university affiliation (p>0,02), working experience (P>0, 01), employers' type (p>0,01).

The discriminant analysis revealed as statistically significant graduate's job as related or not related to T&I (λ = 0,289, $\chi 2$ = 2,87, p <0,001), the quality of MA program course on MTQM as viewed by the respondents (λ = 0,317, $\chi 2$ = 2,48, p <0,002).

Table 1. Graduates' awareness of MTQM

Cluster characterizing graduates' awareness of MTQM	Percentage of respondents
Graduates who were aware of MTQM but never used the respective instruments	8
Graduates who took the course but did not see its usefulness	24
Graduates who took the course on the topic and acquired further skills due to their working requirements	68

The factor analysis based on the open-ended part and aimed to specify those basic factors which influenced the respondents' opinions on the math tools and quantitative methods use in translation and interpreting fields.

1st factor concerned job requirements and contexts (0.982), the factor was identified through the replies of 98% of the respondents, with regard to the nature of their professional activities, no other statistically significant variables were identified.

2st factor related to the contents of the curricular of the MA programs the respondents completed (0.914), the factor was mapped through module on MTQM quality evaluation in the replies of 93% of the respondents. Those who rated the module as "good" (there were no excellent marks in the replies) were positive toward the MTQM in T&I, and those who rated the course as satisfactory or poor were negative or neutral toward the issues under study.

Graduates' age, gender, academic affiliation, working experience, types of employer did not run as statistically significant.

3rd factor turned out to be connected with graduates' personal preferences and individual aptitude to use or to ignore math tools and quantitative methods in their activities (0.763), the factor was mentioned by 75% of the respondents, with no specifics related to the chosen variables.

The close-ended part of the questionnaire formed the basis for cluster analysis and allowed the research team to specify those clusters that provided a more detailed picture regarding the reasons and "building" components for the graduates' positive, neutral or negative attitudes to the use of MTQM.

The first cluster relates respondents' attitude to MTQM with their awareness of the respective tools and methods. **Table 1** specifies the respondents' characteristics regarding the parameter under study.

In **Table 1**, among the clusters the percentage of the respondents was not sensitive to graduates' age ($p>0,01$), gender ($p>0, 01$), working experience ($p>0, 01$). The discriminant analysis demonstrated as statistically significant the characteristics of the university the respondents graduated from ($\lambda = 0,58$, $\chi2 = 5,65$, $p <0,002$), the quality of the MA program ($\lambda = 0, 671$, $\chi2 = 4,65$, $p <0,003$), type of employer ($\lambda = 0,87$, $\chi2 = 5,61$, $p <0,002$), respondents' professional activities as related or not related to ($\lambda = 0, 472$, $\chi2 = 3,61$, $p <0,003$).

Graduates who were aware of MTQM but never used the respective instruments largely involved respondents who graduated from small local universities where the MA program on translation within the Linguistics education field was not well developed, the rest of the group participants represented regional (7%), federal (7%), and metropolitan (5%) universities. Respondents who took the course but did not see its usefulness again involved mostly respondents (76%) who graduated from small local universities where the MA program on translation within the Linguistics education field was not well developed, the rest of the participants represented regional (9%), federal (7%), metropolitan (8%) universities with the same evaluation of the MA program. The group whose members took the course on the topic and acquired useful information and specific skills is formed by those who studied at metropolitan (27%), federal (29%), regional (21%), local universities with solid positive reputation of MA program on T&I (23%).

Most of those who took the course and acquired further skills due to their job requirements work in a recognized academic institution (67%) or in a middle-size/large company related to T&I activities (33%).

The above picture confirms that the inclusion of the module on MTQM into the T&I program curriculum and the professional design of such a module influences the graduates' perception of the course itself and also

Table 2. Graduate's interest in academic research in T&I domain with MTQM application

Clusters, characterizing graduates' interest in academic research in T&I domain with MTQM application	Percentage
Graduates who are not interested in MTQM in T&I studies	21
Graduates who are interested in the topics but the MA program did not elaborate on the issue	18
Graduates who are interested in the topics but need specific skills and not detailed theoretical background	28
Graduates who are interested in the topics but their job requirements do not relate to the subject under study	23

affects graduates' further choice of career pathway, contributes to higher quality and more solid standards of professional activities.

Moreover, the curriculum design should take into account that work in large companies or recognized academic institutions require skills regarding MTQM in T&I. Thus, the course on MTQM in T&I is supposed to leverage the general information on the above methods and tools to particular professional and research context where the graduate can apply them.

The second cluster structures the concept of graduate's interest in academic research in T&I domain with MTQM application. **Table 2** specifies the respondents' characteristics regarding the parameter under study.

In **Table 2**, the group percentage of the respondents was not sensitive to graduates' age ($p>0,01$) gender ($p>0, 02$), working experience ($p>0,01$), and the status of the university they graduated from ($p>0,02$). Nonetheless, the discriminant analysis demonstrated as statistically significant graduates' working requirements ($\lambda = 0,313$ $\chi2 = 4,00$ $p <0,005$), employer's type ($\lambda = 0,216$, $\chi2 = 3,03$, $p <0,01$), the MA program course on MTQM quality ($\lambda = 0,21$ $\chi2 = 3,11$ $p <0,004$).

Among the graduates who were not interested in MTQM there were those whose job requirements and contexts did not relate to T&I studies (59%), or those who worked in a small firm (21%) or in an academic institution that did not require consistent academic research and networking (20%). The graduates who were interested in the topics but needed specific skills and not detailed theoretical background work in recognized academic institution (48%) or in a recognized company that deals with T&I issues (52%). Respondents of this group mentioned they took the course on MTQM at university but it was mostly of theoretical and general overview nature.

The above goes in line with the existing research findings that argue for a practice oriented trend for teaching quantitative research methods in Humanities field (Taylor & Lauren, 2015). Nonetheless, the course on MTQM requires from its designers and teachers to focus their efforts on the verbal and cognitive aspects of the course delivery. The importance of adequate teaching discourse has been mentioned in previous papers regarding humanities (Fedotova & Chigisheva, 2015; Masalimova et al., 2017) as scholars mention that students who study on language programs should be explained the issues regarding technology, IT, and science topics in a plain language (Kenny & Doherty 2014). The present research findings within a new research context also argue for a consistent practice skills-oriented material to be offered to students in a plain language through the module under study.

The third cluster outlines graduate's experience related to MTQM application in T&I research, the characteristi*cs* are presented in **Table 3**.

In **Table 3**, the percentage of the group members in the cluster did not refer to graduates' age ($p>0, 02$), gender ($p>0, 01$), their university affiliation ($p>0,01$), working experience ($p>0,02$).

Nonetheless, the discriminant analysis revealed as statistically significant graduates' job position as related or not related to T&I ($\lambda = 0,378$, $\chi2 = 2,48$, $p <0,002$), type of employer ($\lambda = 0,431$, $\chi2 = 2,89$, $p <0,002$), the quality of MA program as viewed by the respondents ($\lambda = 0,487$, $\chi2 = 4,13$, $p <0,003$).

Among the graduates who were not interested in MTQM there were those whose job requirements and contexts did not relate to T&I studies (59%), or those who worked in a small firm (21%) or in an academic institution that did not require consistent academic research (20%). The respondents of this group evaluated the course on MTQM either as poor (61%) or satisfactory (39%).

Table 3. Graduates' experience in MTQM application

Clusters, characterizing graduates' experience in MTQM application	Percentage
Graduates who have not got any experience in MTQM application in T&I studies as they did not want to deal with MTQM	11
Graduates who have not got any experience in MTQM application in T&I studies as the MA program they enrolled in did not focus on such activities	15
Graduates who have got some experience in MTQM application in T&I studies while drafting their course/paper degree thesis but their current professional activities do not require the use of the tools and methods in question	22
Graduates who have got some experience in MTQM application in T&I studies while drafting course/paper degree thesis and continue to apply the above tools and methods in current professional activities within Academia and/ or Industry settings	52

Table 4. The cluster referring to graduate's working requirements with regard to MTQM application in T&I

Cluster characterizing graduates' working requirements with regard to MTQM application	Percentage
Graduates whose jobs are not concerned with MTQM in T&I as they did not want to deal with MTQM	23
Graduates who work in academic research settings and their jobs require the MTQM application	52
Graduates who work in the field of translation industry and sometimes have to account for MTQM in T&I practice	17
Graduates whose current job does not relate to T&I research or practice though sometimes they have to consider the data processed with MTQM in their professional activities	8

The graduates who had experience in MTQM application and applied them in their everyday work there were those who worked in a recognized academic institution (53%) or in a recognized company that deals with T&I issues (47%). The respondents of this group evaluated the course on MTQM either as satisfactory (47%) or good (53%).

In their personal comments respondents underlined that academic networking inside and beyond his/her academic institution boundaries encouraged their aptitude to MTQM application as there is fostering international trend to embed MTQM into the T&I studies.

The cluster referring to graduate's working requirements with regard to MTQM application in T&I shows respondents' percentage in **Table 4.**

Statistics reveled the tendency to balance the data that clusters 3 and 4 aggregated.

The percentage of the respondents in cluster 4 was not sensitive to graduates' age ($p>0, 01$), gender ($p>0, 01$), their university affiliation ($p>0,01$), working experience ($p>0,02$).

Nonetheless, the discriminant analysis revealed as statistically significant graduate's job position as related or not related to T&I ($\lambda = 0,354$, $\chi2 = 2,51$, $p <0,002$), type of employer ($\lambda = 0,49$, $\chi2 = 3,12$, $p <0,002$), the quality of MA program as viewed by the respondents ($\lambda = 0,416$, $\chi2 = 3,78$, $p <0,003$).

Among the graduates whose jobs were not concerned with MTQM there were those whose job requirements and contexts did not relate to T&I studies (59%), or those who worked in a small firm (21%) or in an academic institution that did not require consistent academic research (20%). The respondents of this group evaluated the course on MTQM either as poor (61%) or satisfactory (39%).

Among the graduates who worked in Academia and had to apply MTQM in their everyday work there were those who worked in recognized academic institution (53%) or in a recognized company that deals with T&I issues (47%). The respondents of this group evaluated the course on MTQM either as satisfactory (47%) or good (53%).

The data confirm that there is a growing need for graduates' experience in MTQM even beyond the Academia: 25% of the respondents were not engaged in the academic research though they had either to account

for MTQM (17% of the respondents who worked in T&I industry) or to consider the data processed through MTQM in their professional activities.

The results of the first step open-ended questionnaire and second step closed-ended questionnaire confirmed the consistency of the overall survey and the balance between statistic data and its interpretation in the process of the above survey stages. The findings of the close-ended questionnaire clarify the general picture of the first insight into the problem through the open-ended survey.

In the course of research two canonical functions were identified and proved the significant difference necessary for further interpretation: graduates' job position as related or not related to T&I (0,61% dispersion, $p<0,000006$), the quality of the MA program as related to the quality of the course on MTQM (0,32% dispersion, $p<0,000005$). The functions are allocated as follows. The function variables that indicate high quality of the above course as evaluated by graduates are at the pole of graduates' positive attitudes. The variables that indicate poor quality course program are at the pole of graduates' negative attitudes.

Regarding the graduates' working requirements (type of employer and job position as related or not related to T&I) function variables linked to those who are involved in T&I activities and to employers with solid reputation are at the pole of graduates' positive attitudes. Variables linked to graduates whose jobs include freelancing, work in a small firm/ institution with no research-led focus switch to the pole of graduates' negative attitudes. The above data is consistent with previous publications on the students' attitude to research (Jusoha & Abidinb, 2012) and confirms the current importance of the quantitative methodology issues in the academic curriculum for translators and interpreters' training. The processed data has cast new light on the issue under study in terms of new audience sampled as it includes university graduates that have become part of the T&I Academia and Industry job market. Using the general approaches to Statistics anxiety studies (Onwuegbuzie & Wilson 2003), the research made specific steps to understand antecedents, nature, and constituent elements of the translators and interpreters' positive and negative attitudes to math tools inclusion in their academic studies.

Moreover, general principles of scale analysis of the attitudes toward research (Papanastasiou & Schumacker, 2014) were applied to identify the degree of constituent components that shape various meaningful scales characterizing the graduates' attitudes to MTQM. The above was reached through factor, cluster, discriminant types of analysis that identified predictable categorical variables in a multiple regression model of T&I MA program graduates' attitude to math tools and quantitative methods inclusion in the academic curriculum. The above variables identification contributes to further requirements for academic developers to implement research-led university curriculum. The importance of such an effect of empirical studies was also mentioned in previous publications (Turner et al., 2008). The present research findings specify the above statement with regard to T&I field.

CONCLUSION

The research results revealed that there is a growing trend to apply MTQM in various settings related to T&I ranging from academic research, and university- based training to T&I industry.

The research findings have confirmed that graduates' attitudes to MTQM in general and to the module inclusion in the University-based translator and interpreter' training depend on two major factors. First, it is the quality of MA program students completed in terms of the contents of program module/course on MTQM in T&I research, and second, graduates' working requirements.

This leads to a full understanding that specific attention should be paid to the contents of the course/module on MTQM for students of graduate programs on T&I.

The course should be practice-oriented and directly related to those professional settings, tasks and challenges that graduates are expected to deal and tackle with. Theory isolated from real life and generalizing narrations are not enough for the modern academic curriculum that should meet the requirements of employers within Academia and Industry regarding skills and abilities of those who engage in translation and interpretation as a process or research field.

The above fosters interdisciplinary nature of university-based training on T&I, requires that educators put more efforts to make it possible to introduce math concepts and tools in a way that that would help language students cope with anxiety and become competent when dealing with assignments that require data processing through quantitative methods and tools.

Particular emphasis should be laid on instrumental apparatus. It is obvious that a course on MTQM for students of degree programs on T&I needs a module aimed to develop students' skills regarding the use of Statistic Package for Social Sciences that would save time in the process of academic research or applied needs-based projects.

Further research is required to explore university teachers' opinions regarding their own abilities and students' capacities to deal with MTQM in the process of academic activities. Future studies should focus on the employers' observations regarding novice specialists' skills and activities related to the application of MTQM. Moreover, it seems interesting to explore the above-mentioned issues within international landscape and settings.

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