

RETHINKING CAREER PATHS: THE METHODOLOGY OF TEACHING MATHEMATICS AND ENGLISH TO ADULT TEACHERS THROUGH CONVERSION PROGRAMMES - A COMPARATIVE STUDY

M.A.P. PURCARU¹

A. NECHIFOR²

Abstract: *The current research is part of the European project “Professional training of teachers in the pre-university education system for new opportunities in career development”, and its main purposes are to identify and compare the participants’ opinions and results, in order to prove the efficiency of the modules of Didactics of Mathematics in the “Mathematics programme” and of Didactics of English in the “English programme” in developing the specific competences for teaching Mathematics/English. The instruments of this study are complementary, highlighting both the subjective aspect, provided by the opinions of the participants, and the objective aspect, present in the results of the two programmes. We extracted the personal opinions of the candidates, their competency, their plans for the future and their capacity to learn. The resulting data is compared against the results of the examinations, therefore confirming or negating the general self-evaluation.*

Key words: *Mathematics, English, lifelong learning programmes, professional conversion, teaching.*

1. Introduction

The programmes for lifelong learning have benefited from a tremendous growth in the past years [1], [2], [8]. Inside this frame, due to the existing needs present in the educational system, the professional reconversion programmes for teachers were designed [5], [10], [12], [13].

The current study is a part of one of these programmes, as already mentioned in the abstract, called: “Professional training of teachers in the pre-university education

system for new opportunities in career development”, contract number POSDRU/57/1.3/S/32629. This project, a European project of professional reconversion, which was designed as a distance learning process, consequently using specific instruments for this [9], with a span of four semesters, helped the teachers who wanted to gain a new specialization, thus enabling them to further complete their teaching base norms.

The motivation for participating in the programme varies and the arguments are as

¹ Faculty of Mathematics and Informatics, *Transilvania* University of Braşov.

² Faculty of Letters, *Transilvania* University of Braşov.

follows: an incomplete norm in the initial specialization and the possibility to complete it with classes of the new specialization, the anticipation of growth in the chosen specialization field, the will for constant improvement, gathering research credits as a result of attending the classes.

There are two main reasons for matching and comparing these two domains: first of all, the footprint of two different programmes from two separate fields of study – scientific and humanistic. Viewing the approach from two different angles has the advantage of better highlighting the structure, the intervention mechanism and the feedback, regardless of the content. Second of all, each of the two chosen fields of study has a dominant role inside its own faculty. On one side, Mathematics is a main subject and the instrument of many specialities in the scientific field a key subject in continuous learning, on the other side, the English language is gaining more and more field in the humanistic profile as a communication medium [6].

Studying both, apparently unrelated, fields and correlating them, was a great exercise in interdisciplinary, especially because the attempt was made less at a content level (Mathematics or English properly) and more at the level of teaching these two subjects, meaning at the didactic level.

The Didactic of Mathematics, a border discipline of knowledge with Mathematics learning theories, Psychology of education and Pedagogy deals with the study of modern mathematical concepts for the teaching of Mathematics at school, with the problems involved in the organisation, communication, evaluation of mathematical knowledge [3].

Today, when Mathematics is the language of science the Mathematics Education is a key activity.

Mathematics Education, is understood as a whole set of actions and conditions that

make the teaching of Mathematics possible. Therefore, it covers the set of knowledge, processes and conditions that allow the student-teacher interaction about mathematics topics to take place in the Mathematics class, thus, making the teaching and learning of Mathematics feasible. Mathematics Education refers, in this case, to an activity which is intentionally used to build, understand, transmit and assess mathematical knowledge [7].

The introductory part discusses mainly the Mathematics field, because the English topic is only a comparison group.

2. Purpose and methodology of the research

The main objectives of the ascertaining type of research[4] are: 1. identifying and comparing the opinions of the participants about the efficiency of the didactic modules of Mathematics, respectively of the didactic modules of English and pedagogical internship, in developing the specific competences for teaching Mathematics, respectively English; 2. the comparative analysis of the students' results from the didactics modules, the pedagogical internship and the graduation exam of both continuous learning programs: Mathematics and English. Both objectives are complementary.

The methods used in our research were: the questionnaire based survey and the analysis of school papers. Each method had its own instruments, as follows: the first instrument was a questionnaire with 11 questions and 48 statements based on participants' experience in the two programmes. The questionnaire was given to the participants to fill in at a face to face meeting. The second instrument was based on the results of the students in the didactics modules, the pedagogical internship sessions and in the final

graduation exam, where their cumulated knowledge in the new specialization was evaluated.

From the participants in the study, we selected 47 teachers, 25 who attended the “Mathematics” programme in this project and 22 who attended the “English” programme, in the same project.

The distribution of the participants from Mathematics was according to the next criteria: gender (6 male and 19 women) and age (26 to 56 years old, the average – 41.50 years old). The distribution of the participants from English: gender (1 male and 21 women) and age (26 to 57 years old, the average – 37.86 years old).

For the Mathematics programme: 18 participants are teachers in secondary school, 5 in primary school, 1 is a preschool teacher and 1 is a principal. For the English program: 16 participants are teachers in secondary school, 1 in primary school, 2 are preschool teachers and 1 is an inspector. The corresponding institutions where each of the participant teach are listed in the diagrams below (Fig. 1; Fig. 2).

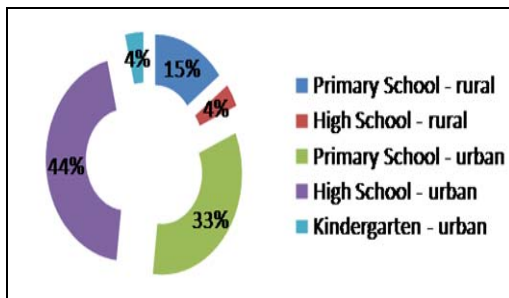


Fig. 1. *Distribution according to teaching institution - Mathematics*

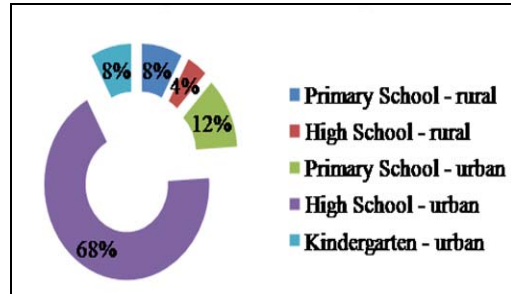


Fig. 2. *Distribution according to teaching institution - English*

The participants from both the Mathematics and the English programmes mainly work in the urban environment (81%, 88%). Regarding the school where they teach, we can see that most participants were currently teaching at a high school level. From these diagrams we would like to highlight the following observation: if initially, the professional conversion programme had, as its main target, the teachers in the rural areas, the focus seems to have shifted towards the urban areas.

Another criterion was: subject taught (Fig. 3; Fig. 4).

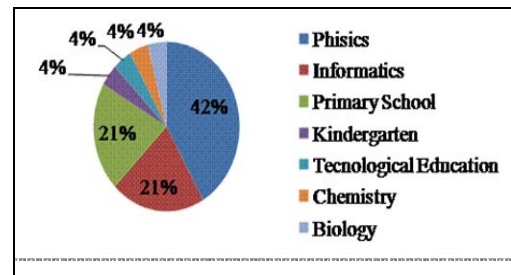


Fig. 3. *Distribution according to specialization - Mathematics*

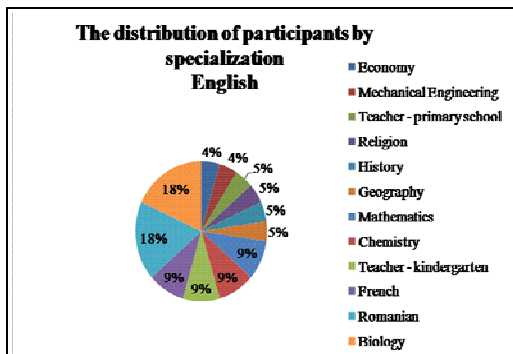


Fig. 4. *Distribution according to specialization –English*

The participants mostly belong to the scientific field (Mathematics), although an exception was made by the primary school teachers and kindergarten teachers, which belong both to sciences and humanities. We found, surprisingly enough, that participants from the scientific specialty turned towards the English field.

We also asked the participants to tell us how many years of experience they have in the work field: 3 to 33 years (the average – 18.77 years) - for the Mathematics programme and 3 to 26 years (the average – 12.77 years) – for the English programme.

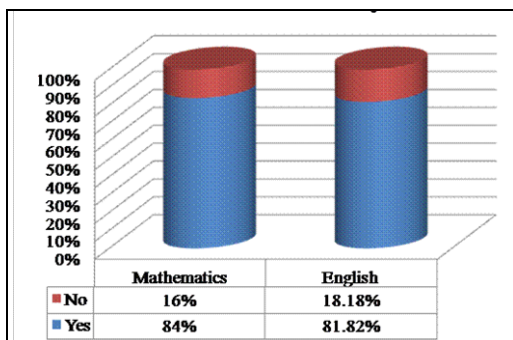


Fig. 5. *Distribution according to prior knowledge in the new field of study*

Another criterion was represented by the level of prior knowledge about or in the new field of study (Fig. 5). From the

diagrams below we could draw the conclusion that in both the Mathematics and the English programmes almost 20 percent of all participants had prior knowledge about or in their chosen fields

3. Results and discussions

We tried to identify the participants' opinions towards the efficiency of the didactics of Mathematics, didactics of English and pedagogical internship modules, in developing the specific competences for teaching Mathematics and English. The competence is composed of knowledge, capacities and attitudes towards this domain.

First of all, we asked the participants to appreciate the degree in which the previous specializations, closely related to the new specialization, helped them assimilate the knowledge thought in the conversion programmes and if the previous unrelated specialization represented and impediment in learning new content (Fig. 6).

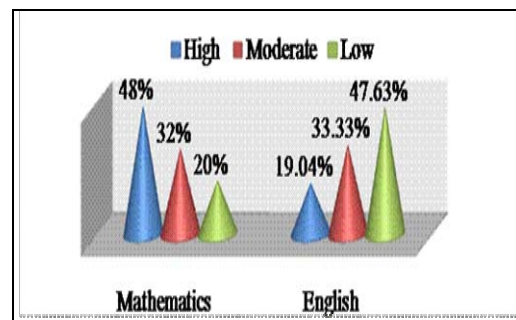


Fig. 6. *The influence of the main specialization upon assimilating the new specialization*

The results of this histogram must be correlated with the professional structure of the two groups of participants available in the distribution by specialization graphs. We noticed that: for Mathematics, where the previous specialization of the participants was relatively homogenous, in

the fields of sciences – learning the new specialization was supported by the previous profile (48%). For English, where the participants belonged to both the humanistic and the science fields, the majority (48.63%) reported a low influence of the previous specialization in learning the new one.

In order to evaluate the Mathematics and English knowledge of the participants we considered the final results of the students at the graduation exam, which evaluated the gained knowledge for six fundamental disciplines taught in the conversion programme. Thus, the results for the Mathematics students were: 5 grades of 10 (20%), 17 grades between 9 and 10 (68%) and 3 grades between 8 and 9 (12%). The results for the English students were: 7 grades between 9 and 10 (31.82%), 10 grades between 8 and 9 (45.46%) and 5 grades between 7 and 8 (22.72%). As a conclusion, most participants in the two reconversion programmes got results that can confirm their qualification for teaching the second specialization.

The next step was to identify the Mathematics and English teaching capabilities of the participants, so we asked them to assess their skills. The results are presented in fig. 7 and reveal the fact that most of the participants were of the opinion that they had the necessary mathematical and English abilities.

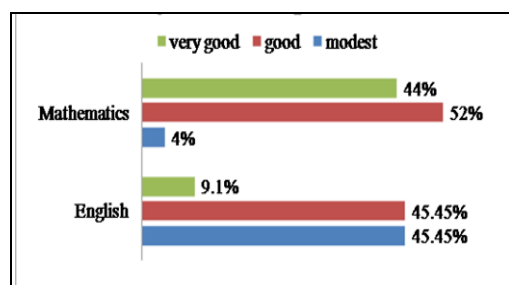


Fig. 7. *Self-assessment of the teaching ability in the new specialization*

For Mathematics, we could see that 96% of the participants felt that they were ready to teach immediately after the end of the programme and considered that they had gained the required skills to a “good” or “very good” degree in the new specialization, while only 44% considered that they were “good enough”. At the opposite end, 4% considered themselves “modestly” capable of teaching the new specialization.

For the English programme, 54.55% of the participants felt that they were ready to teach immediately after the project was over and considered that they had gained the required skills to a “good” or “very good” degree in the new specialization, the rest of 45.45% having evaluated themselves as being “modestly” trained in teaching the new specialization.

The answers quantified by the fig. 8 diagram better illustrate the “capacity” component of competency in the desired field because it combines the accumulated theory from the Mathematics and English Didactics modules with the pedagogical internship resulting into the general teaching capability.

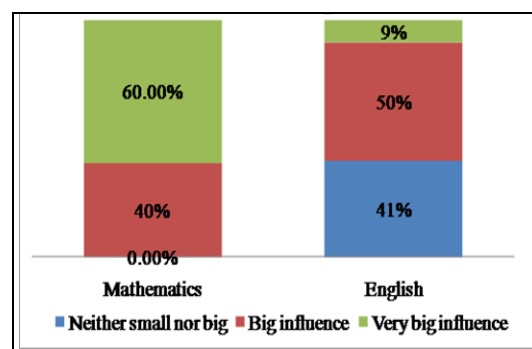


Fig. 8. *Use of didactic principles learned within the Pedagogical internship*

We noticed that 90% of the participants in the Mathematics programme and 59% of the English ones felt a solid influence on

the pedagogical internship from the didactic disciplines learned.

In order to evaluate the capacity for teaching Mathematics and English we also considered the grades of the students for the disciplines of Didactics and Pedagogical Internship:

All the participants in the Mathematics programme got straight 10s in both disciplines.

The results for the participants in the English language program were: All the participants got straight 10s in Didactics and for Pedagogical Internship:

12 grades of 10 (54,55%), 6 grades between 9 and 10 (27,28%), 1 grade between 8 and 9 (4,54%) and 2grade between 7 and 8 (13,63%).

As it can be observed, the majority of the participants in both professional training programmes obtained results that can confirm gaining the necessary skills in order to be able to teach the second specializations. To these “good” and “very good” results a lot of other factors have contributed, among which: the students’ general knowledge of Didactics, as well as their teaching experience gained prior to this project.

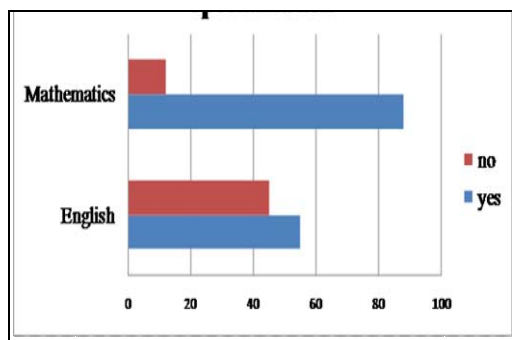


Fig. 9. *Opinion regarding active teaching of the new specialization*

The last step was to identify the opinion and the attitude of the participants towards teaching Mathematics and teaching

English. The graph in fig. 9 shows the determination the participants had at the end of the programmes to teach the newly acquired specialization.

The majority of the students in Mathematics, respectively in English (88%, 55%) wanted to actively teach the new specialization. Yet, this thing depends not only on the participant’s decision as an internal factor, but also on external factors, such as: the existing vacant jobs, the educational system, the headmaster of the institution, the director of the chair, etc.

The attitude of the participants in the two training programmes, regarding the professional confidence gained, is shown in fig. 10.

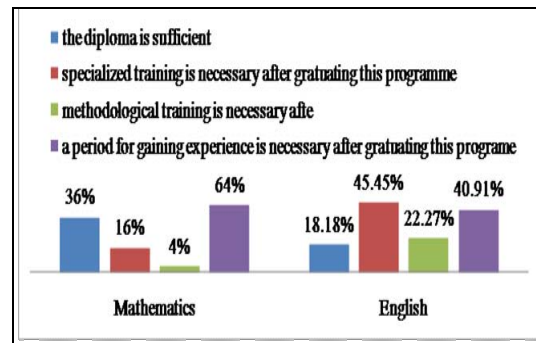


Fig. 10. *Professional confidence gained in the new subject*

Before commenting upon the outcomes of the survey, mention should be made about the fact that the previous specialization of the participants played an important role in the professional confidence gained as a result of graduating from the conversion programme, first of all, from the point of view of the pedagogical internship, and second of all, from the point of view of the closeness/familiarity the participants experienced in connection to the new specialization. For example, for participants in the Mathematics programme/English programme who had

as previous subjects taught Physics/French, in this order, the degree of confidence generated was higher.

Returning to the graphic, both for Mathematics and for English, only a small percentage (36%, 18.18%) indicates the participants who considered the diploma awarded as a sufficient element to teach in the new specialization. The stress, for the professional confidence gained in Mathematics, falls on the utility of an intermediate period of experience in which the participants could accommodate with the new position and could commit to their long term memory the knowledge and the information acquired as a result of the training programme graduated. In what the professional confidence built by the participants in the English programme is concerned, there's a certain oscillation between the intermediate period of experience and the necessity to attend another training course, on the same topic, and having the same profile with the one just graduated.

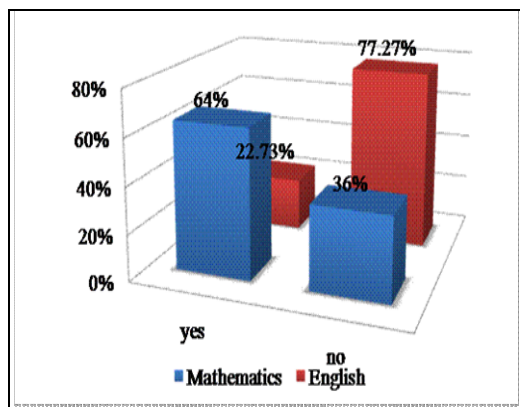


Fig. 11. *Opinion regarding attendance to another training program after graduating the first one*

The last question of the questionnaire raised the problem of the direct connection between the two subjects: Mathematics and English and aimed at the flexibility

and receptiveness of the students with respect to participating in a programme totally opposed to the one just graduated: English, respectively Mathematics, in this order (Fig. 11).

The graph portrays the confidence of the participants regarding the idea of enrolling themselves in another training programme after finishing the current one. The criteria taken into account consider getting accustomed to the concept of professional reconversion, the atmosphere during the programme, learning the new content and the new specialization, the chances to actually teach (in)/the new specialisation. Thus, for the Mathematics programme, the majority (64%) welcomed the idea of another training programme, as opposed to the participants in the English programme who rejected the very same idea (77.27%).

4. Conclusions

The efficiency of the reconversion training programmes, in Mathematics and in English, was supported, for the majority of the participants, by the results of the research, regarding their knowledge, their abilities and their teaching skills relative to teaching Mathematics/English, meaning gaining their competences necessary for obtaining a new specialization.

Treating the two suggested programmes in parallel opened two directions:

On the one hand, it can be observed that, by means of the specialised methodology that all the participants attended in their specialisation, a certain connecting bridge could be created between the two subjects (Mathematics and English). The interdisciplinary approach in general enforces a possible information transfer which enables an exchange of experience and competences from one domain to the other, thus aiming at adaptation, improvement and reciprocal correction of possible malfunctions.

On the other hand, it can be seen that the limit between the two profiles situated at distant ends, scientific and humanistic, is diluted. Thus, the study showed that there was a significant number of participants who crossed the line from one scientific specialisation to a humanistic one and vice versa, in other words, from one end to the other, when they chose a reconversion programme. Moreover, there were also the flexibility and the receptiveness the participants displayed regarding another training programme (English/Mathematics), as a continuation after finishing the first one (Mathematics/English), which can only invite even more to further research of the type the present paper intended to initiate.

In a future paper we'll make a few case studies of some participants which taught immediately after graduation, we'll give examples of opinions and a deeper analysis of the participants' professional background and its relationship with the confidence in the gained competence.

Other information may be obtained from the address: mpurcaru@unitbv.ro.

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