
Problem solving in teaching foreign languages to students of pedagogical departments

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Abstract: *The goal of the suggested article is to review some existing research dealing with application of problem solving to education and to offer some practical recommendations for methods of teacher training in foreign languages based on problem solving. The essence of problem solving in education is first of all acquisition of methods of gaining new knowledge independently, based on application of existing knowledge and skills. Thus, it is quite logical that this approach is particularly productive in teaching foreign languages to future teachers of any subjects. Several aspects of application of problem solving in teaching a foreign language are being discussed. The article suggests a description of a class dealing with the application of problem solving towards teaching a foreign language.*

Keywords: problem solving, communicative approach, traditional pedagogy, memorization, knowledge and skills

Introduction

According to Ormond (2006:111) problem solving is using existing knowledge and skills to address an unanswered question or troubling situation, while problem based learning is approach to instruction in which students acquire new knowledge and skills while working on a complex problem similar to those in the outside world (Ormond, 2006:121).

Problem solving was introduced to education as early as ancient times. Socrates, in particular, was famous for applying it (History...). Later it was almost totally abandoned and revived only in the 1960s. Recently it has been widely studied and popularized (Martinez, 1998; Botti, J.A. & Myers, R., 1995, Simon, 1980), especially for teaching mathematics and science at school and at university. However, surprisingly for us, problem solving has not been very widely applied towards either teacher training or teaching foreign languages.

On the one hand, independent of specialization, teacher's

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profession is characterized by necessity to make dozens of decisions during one class. “Researchers have found that teachers make up to thirty decisions every hour and do so in a context of a class between twenty five and forty pupils where 1,500 interactions can take place daily between teacher and pupils” (Berliner as cited in Burke, 1996:534). Shulman (1987:376) even compares the stressfulness of teachers' work to that of emergency surgeons during or after a natural disaster. On the other hand, the main - practical - goal and the communicative approach towards teaching foreign languages mean that learners need not only to acquire a certain amount of linguistic material but also to be able to use this material in permanently arising new situations.

The aim of traditional pedagogy is to provide acquisition by the learners of knowledge previously gained by humanity. This is basically achieved through memorization. Contemporary society poses so many problems in front of specialists that it is hardly possible to acquire all knowledge and skills that they will need for professional activities during their career. The essence of problem solving in education is first of all to acquire methods of gaining new knowledge independently based on application of existing knowledge and skills. Thus, it is quite logical that this approach is particularly productive in teaching foreign languages to teachers of various subjects.

Nussbaum and Novick (1982) suggest that traditional instruction seldom provides for students to experience cognitive conflict.

Thomas (2000:9) summarized reports by the New American Schools Development Corp for the years 1993 through 1999. He states that nine of ten schools that implemented problem based learning demonstrated significant improvement in students' test scores on standardized tests of academic achievement. Problem based learning has also been successfully applied for teaching medical students (Norman & Schmidt, 1992; Barrows, 1980). Thomas (2000:34-35) comes to conclusions that:

- There is direct and indirect evidence, both from students and teachers, that problem-based learning is a more popular method of instruction than traditional methods.

- Problem based learning seems to be equivalent or slightly better than other models of instruction for producing gains in general academic achievement and for developing lower-level cognitive skills in traditional subject matter areas.

- More important, there is some evidence that problem based learning, in comparison to other instructional methods, has value for enhancing the quality of students' learning in subject matter areas.

According to Finkle and Torp (1995:1), “problem-based learning is a curriculum development and instructional system that simultaneously develops both problem-solving strategies and disciplinary knowledge bases and skills by placing students in the active role of problem-solvers confronted with an ill-structured problem that mirrors real-world problems.”

Norman and Schmidt (1992: 557) state that there are three roles for problem-based learning. The first is the acquisition of factual knowledge, the second is the mastery of general principles or concepts that can be transferred to solve similar problems, and third, the acquisition of prior examples that can be used in future problem solving situations of a similar nature. They also say:

1) learning medicine in a problem-based format may initially reduce levels of learning (this may be due to the difficulty to the difficulty in determining what students learned using traditional competence measures), but may foster , over periods up to several years, increased retention of knowledge;

2) some preliminary evidence suggest that problem based curricula may enhance both transfer of concepts to new problems and integration of basic science concepts into clinical problems;

3) problem based learning enhances intrinsic interest in the subject matter;

4) and problem based learning appears to enhance self-directed learning skills (metacognition) and this enhancement may be maintained (Norman & Schmidt, 1992:564).

In a problem based learning classroom, teachers should act as cognitive coaches, serving as models, thinking aloud with students and practicing behavior they want their students to use (Stepien & Gallagher, 1993).

Aspects of problem solving approach to foreign language teaching

Foreign language as a school subject is skill oriented. Thus, problem solving approach applied to it implies different components than

when it is applied to subjects that are knowledge oriented (e.g. history).

We believe that problem solving in teaching a foreign language means:

- avoidance of giving ready-made answers in the process of presentation of new grammar and vocabulary, involvement of students in the formulation of grammatical rules and elicitation of vocabulary meanings from the given examples,

- ability of students to overcome independently the language problems arising in the process of communication,

- discussing / solving non-professional, everyday life problems through communication in the foreign language,

- discussion of texts dealing with problems,

- discussing / solving professional problems through communication in the foreign language (Gorgiladze, 2005: 51).

To develop the students' ability to overcome foreign language problems independently it is necessary to spend several lectures on working out their strategies of linguistic problem solving. For reading and writing these strategies are derivational, context and situational analysis, application of general knowledge and knowledge of native and other known languages. For speaking and writing these strategies involve avoidance and paraphrasing.

Language problem solving is first done under teacher guidance, with explanations of each step, such as in the situation described below.

Students could not understand the difference between “answer” and “response”. The teacher suggested them to view the following contexts and to come to conclusion.

- *Are you a good learner? Find answers to this question in this article.*

- *Ask questions on any topic, get real answers from real people.*

- *Have a question? Ask it. Know an answer?*

- *Barack Obama's response to Bush's final State of the Union.*

- *This is a response to the various recommendations received by us.*

As the students were unable to notice the difference, the teacher told them to pay attention to another word which always appeared together with “answer”. Then the students noticed that “question” did not typically appear with “response”. Finally they came to conclusion that question is followed by answer, while any action / words can be followed by response or reaction.

After students get some practice in eliciting the meaning under teacher's guidance, they are only reminded the case and recommended to speak out the reasoning themselves. Finally, they should be able to do it totally independently.

When students need a word in the process of speaking or writing and ask for teacher's help, the teacher should guide them in finding a good synonym, antonym or formulating a definition. When the students ask the teacher to translate a native language word, it is a better idea to find some synonyms in the native language and to try to recollect their translation. If this strategy does not help, the strategy of giving a definition should be worked out:

- classify the object,
- name the function of the object,
- name the materials / the color / the size, etc.
- compare it with something.

The teacher should recommend the students to name only essential characteristics of the object, such as “the substance used for removing stains from clothes”, “the bird which cannot fly like an ostrich, but which is not as big and has no wings”, etc.

Discussing / solving both non-professional and professional problems and texts containing problems contributes to moving the emphasis from the language task to true communication. It is essential to choose problems to solve which students have background knowledge. If students have problems in discussion the teacher's task is to direct their discussion as unnoticeably as possible by some hints, interesting questions, etc.

Below we offer as a sample some tasks that were used by us during an English class with students of pedagogical specialties. The topic of the class is “Course book”. The main goals of the lesson are:

- to contribute to development of speaking skills on the given topic. However, other skills such as reading and writing as well as vocabulary teaching are also involved.

- to promote teacher qualification – understanding the requirements towards course books.

The advertisements and the students' opinions involved in the tasks are authentic.

1. Exemplify the terms "textbook", "course book" and "manual" based on the information below.

Do you know that the Georgian word "saxel mZRvanel o" may be translated as a textbook, a course book or a manual? A textbook is a book for learning basically consisting of texts. So, strictly speaking, this word cannot describe a book full of formulae or problems. A manual is a book that is conveniently handled, a kind of a guidebook or a set of instructions on how to do something. So today the term "course book" is most often used in education.

2. You need to write a description of a course book. These are the descriptions from 1996 Heinemann catalogue of three English course books. Select from them vocabulary useful for your purpose:

a) *Story World* by David Vale, Stephen Mullaney & Pat Murphey (1993)

Extensively piloted for pre-school children, *Story World*

- is full of well-loved stories, rhymes, songs, games and craft activities,

- provides the best environment for an early experience of English,

- lets children create their own story book to take home and keep,

- centers round a beautifully illustrated giant Big Book,

- introduces a highly original way of teaching vocabulary with children playing with Flash Cards and posting their own words into the Story Box.

b) *Snip Snap* by Leonor Concari, Fernanda Hirsch & Joane Urrestarazu (1996)

A complete two level course for children just starting to learn English. Snip Snap A has no writing in it at all and Snip Snap B introduces reading and writing in a very gentle way.

- Pupil's Books contain full-colour stories, masks and songs.
- Giant size picture cards are ideal for use in large classes.

- Activity Books include drawing, matching, cutting out and listening activities.

c) *Finding Out* by David Paul (1993)

- uses the "questioning approach" in which children are encouraged to learn by being curious, asking questions and finding out answers,

- contains more than 75 effective games that foster active learning,

- language is achievable for children who have only one or two lessons a week,

- simple approach to phonics enables children to make rapid progress in reading and writing,

- easy-to-use Teacher's Book with photocopiable games,

- cassette has model pronunciation and extended versions of the songs, chants and dialogues.

3. Arrange the selected vocabulary into logical groups. Below some of the groups and words are given:

Age:	Level:	Components:
Tasks:: reading,: fairy tales,
.....: original,: cards,: approach,

4. You are teaching 3rd graders. This is their second year of learning English. Say which of the books described above you would use. Give your reasons. Remember that there is no "correct" or "wrong" solution to this

problem.

5. Speak about some course book in any subject you especially like or dislike. Give reasons.

6. Agree on a course book known to all of you. Then, in groups of 3-4 students, make up questionnaires to evaluate it. Exchange them and fill them in. Finally compare the results.

7. Below find and read 4 opinions about what is a good course book. Write out the words that teachers and students use to prove that a book is good. Say which position is close to yours. Explain your position.

a) Nino Meskhishvili, 19, a student of English, her second foreign language is Italian:

I have recently started to learn Italian. I don't think what they teach us at the university is enough to learn it well enough in such a short time. So I decided to buy a couple of books for individual studies. First of all, I prefer a book written by a Georgian author with explanations in Georgian as my Italian is still too poor. Besides, they are cheaper. There were some short story books at the shop, but I think it's too early for me to read them. What is more important for me now is a lot of grammar exercises and grammar tables: pronouns, verb conjugation and such things. The tasks, at least the difficult ones, should have keys. If the book is widely used I believe it's good. And it's fine if it's nice to look at, but that is not terribly important.

b) Greg Dabelstein, 20, a student from Canada majoring in programming:

Last year I went to Mexico on my vacation and I took a Spanish phrase book with me hoping it would help me to communicate there. Alas! It practically didn't. I enjoyed my stay there and I want to go there again this summer, but I'd like to learn some Spanish before I go. The available books and on-line courses have so many levels, but all I need is to get acquainted with girls on the beach or in a bar and to chat with them and, of course, some small talk at the hotel, shops and in the streets. A friend of mine recommended me a "Survival English" course, but it gives almost no conversational clichés, to say nothing of slang. And I need dialogs, not texts. I'm afraid no good book for my purpose has been written yet.

c) Jennifer Vuillemot, 34, a high school French teacher from Australia.

I am ethnically French though my native language really is English, not French. I have several times visited my relatives in France and Canada and I think to know more about these countries should be very interesting for my teenage students who might be learning French in order to go there one day. So when I choose books for my students I always pay attention to cultural information in them. If the book doesn't look attractive, my students won't be stimulated to learn. I believe that if the texts are good, the students will pick up the language without doing too many drills. So I pay more attention to texts than to tasks while choosing the book. And - last but not least - sense of humor! I hate books that contain no humorous stories, jokes, and cartoons.

d) Heinrich Keller, 45, an English language teacher from Germany.

To begin with, I do not trust publicity. I mean not only ads and catalogues, but also public opinion. Today there are so many books on the market whose only goal is to make money. They are beautiful, the authors declare that they are communicative and innovative, but finally it turns out that they are far from systematic and thus can teach one very little. I need to study the book carefully, to use it for teaching for some time to decide whether it is good or bad. I teach adult students so I think all that fuss about impressive and abundant illustrations is just an advertising trick. What I value in a course book is clear and interesting tasks, colourful and natural language for communication, a new approach to presentation or training the vocabulary and grammar, the variety of topics and functions, taking your learners' interests into consideration, as many support materials as possible: glossary, grammar tables, readers, audio and video cassettes.

8. Write an ad for a real or imaginary course book. Put all ads on the ad board for everybody to read. Each student should "buy" any book except his / her own. See which ad is the winner - which book "sells" best. Analyse the reasons.

As Thomas (2000: 36) states, there is still not enough evidence of efficiency of problem based learning compared to other teaching methods such as traditional instruction. Most publications provide the information how to carry it out and success stories of teaching in some classes or schools – but in fact no comparison. That is why we will briefly describe our experiment based on comparison of traditional and problem solving teaching.

The efficiency of methods of teaching suggested by us was experimentally tested at Batumi State Pedagogical College during one year of teaching English to future primary school teachers whose native language is Georgian. Their initial level of English was Intermediate. They were second year students who had been learning English at school for 7 years and for one year at the college. All 4 groups that participated in research were selected in such a way that they had a rather homogeneous level of English skills tested before the experiment started. The participants' age was 17-21, most of them females.

The textbooks used, the grammar and the vocabulary under study, the discussion and writing topics were the same in the 2 control groups taught almost without problem solving (totally 25 students) and the 2 experimental groups (totally 24 students) where linguistic and non-linguistic problem solving was applied as much as possible. The presentation of new vocabulary, grammar and reading texts as well as acquisition in experimental groups was mostly carried out in the way typical for problem based learning. For example, when some problems of vocabulary understanding arose the teacher did not give a ready-made answer but hinted how to analyze the context and the situation so that the students arrived at understanding of the word semantics themselves. The students of experimental groups especially enjoyed dealing with detective stories where they played the role of inspectors and the professional problems that they had to “solve”.

Below in tables I and II find the average results of testing in the four groups in English and Education which show that experimental groups achieved more inspiring results than control conditions. The grading was done in 5-point system applied at the college at the time of experiment. If in the experimental groups the post-experimental results were noticeably higher than the pre-experimental results, in control groups they were lower. The tendency in all groups on the pre-experimental stage and in the control groups during the experiment for the results to decline or – in best case - to remain unchanged can be explained not only by low efficiency of traditional methods but also by lack of motivation accompanying them.

Table I: Average test results in English according to semesters

Group Semester	1 st semester –pre-experimantal	Standard deviation	2 nd semester – pre-experimantal	Standard deviation	3 rd semester – during the experiment	Standard deviation	4 th semester – at the end of experiment	Standard deviation
1 st control group	3.77	0.60	3.38	0.65	3.31	0.63	3.31	0.63
2 nd control group	3.67	0.65	3.41	0.51	3.33	0.49	3.25	0.45
1 st experimental group	3.50	0.67	3.41	0.67	3.75	0.75	4.14	0.72
2 nd experimental group	3.67	0.78	3.41	0.67	3.83	0.74	4.33	0.72

Table II: Average test results in Education according to semesters

Group Semester	1 st semester – pre-experimental	Standard deviation	2 nd semester – pre-experimental	Standard deviation	3 rd semester – during the experiment	Standard deviation	4 th semester – at the end of experiment	Standard deviation
1 st control group	3.69	0.48	3.69	0.48	3.61	0.50	3.46	0.52
2 nd control group	3.75	0.62	3.67	0.49	3.67	0.49	3.31	0.51
1 st experimental group	3.92	0.67	3.83	0.58	4.25	0.62	4.42	0.51
2 nd experimental group	4.0	0.74	4.0	0.74	4.42	0.51	4.50	0.52

The average grades in English in experimental groups were decreasing on pre-experimental stage similarly to control groups, but during the experimental stage they increased from 3.5/3.67 to 4.14/4.33, while in control groups they decreased from 3.7/3.6 to 3.3/3.1. The average grades in Education in experimental groups also were decreasing on pre-experimental stage similarly to control groups, while during the experimental stage they increased from 3.8/4.0 to 4.4/4.5 (Gorgiladze, 2005:96). The standard deviation in calculations was between 0.48 and 0.78, which leaves the results reliable enough, taking into consideration that the assessment scale consisted of only three positive grades: 3, 4 and 5. This enables us to recommend problem solving and the described activities for wider application. In the future we would like to continue research, holding test on a 100-point basis, to receive more precise results.

Conclusion

Realization of the problem solving in foreign languages teaching is a time-consuming process both on the teacher's (planning, materials selection) and the learner's (arriving at solution) part. It takes more time to come to conclusions totally independently or under teacher's tactful guidance than through traditional explanation. It is an intellectually demanding approach for both teachers and learners, too. But this approach is indispensable if we want our learners not only to have essential knowledge, which today very quickly becomes outdated, but also to have the skills to acquire knowledge incessantly. This idea of various authors (Barrows, 1980, Botti & Myers, 1995, etc.) was supported by our research as well. We hope that our recommendations will to some extent help foreign language teachers to apply this approach and become as enthusiastic about it as we are.

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