Artificial intelligence in Supervised learning

DANIMIR MANDIC
University of Belgrade
SERBIA

danimir.mandic@uf.bg.ac.rs http://www.uf.bg.ac.rs

Abstract:

Supervised learning is based on principles of programmed learning powered by artificial intelligence.. Supervised learning is created to define precisely learning content, to fix activities which will enable success, pruvide conditions and means for that, create favourable psychological climate for acquiring knowledge, its control and development of human capabilities. On the other hand, supervised learning results from teacher's need to know how much and how pupils learns, what are their difficulties and how it is possible, to eliminate them. New educational technology, powered by artifitiel inteligence, has influence on introducing important changes in organization of educational institutions, contents and methods of teaching activity as well as in relations in institutions that are conducting teaching and education. Here we shall talk about supervised learning and intelligent software in order to indicate their place and role in modern teaching. Conditions are made for raising maximum success with minimum efforts and there are instruments and possibilities for adequate evaluaation of young people work. It is also achieved therewith that learning becomes entertaining to a certain degree and it engages pupils attention more strongly. The fact that programmed teaching takes care about intelligence, knowledge, level of reading skill of pupils, results of diagnostic tests and teacher grade, also contributes to its quality. In supervised teaching information is usually given, a problem stated that pupil should solve, after that pupil gives his solution, does the operation (in case it is not automatically solved) to see the solution given by programmer, does comparison, eventual corrections and completions, gets a grade and instructions for further work. Thus dynamized learning is suitable to psychological characteristics of child and for that reason he is tireless in work in his first contacts with supervised teaching. Supervised learning is sometimes called autoinstruction, automatic instruction or selfinstruction because function of teacher in giving information is reduced to minimum or, in some cases, it is not evident at all. It is the reason why „pedagogical fashionable persons“ give brave statement that modern computers will replace teacher. However, researches have shown that “learning machines” are only one (truly very improved) teaching aid, but they do not replace teacher but influence gradual change of his function, to create new possibilities for learning and advancement of teaching. Therefore, it is a false dilemma „machines or man“, and real solution is „intelligent machines in hands of man“

Key-Words supervised learning, artificial intelligence, knowledge engineering, educational technology

1. Introduction

Education and learning can not be mechanically compared with other activities. It is not the process of modelling raw material into certain final product, but it is the process of person development who has need to learn, to approach educational contents selectively, and can not be modelled according to the wish of somebody who organizes teaching and implements education, regarless more or less successful application of means, forms and methods. Education and learning are not acitvities giving final and perfect products. Education products are never final and that is why it is impossible to completely define education aims as a final result. For that reason the task of modern education is to enable young and adult people for life and work in the society of sudden charges, to develop their conscience about the need to continue

learning even after finishing their school and to learn the techniques of learning. Supervised learning came from need to define precisely learning content, to fix activities which will enable success, provide conditions and means for that, create favourable psychological climate for acquiring knowledge, its control and development of human capabilities. [3] On the other hand, programmed learning results from teacher's need to know how much and how pupils learns, what are their difficulties and how it is possible, to eliminate them. Pupil himself in the process of programmed teaching is able to learn things he is interested in, in accordance with his individual ablities, his speed, with constant encouragements in conditions for return connecti on from pupil to teacher and for work where success is guaranteed.

2. Basic factors important for supervised learning

Programmed materials can not be taken approximately, based on subjective convictions and personal experience, as it was sometimes done in selection of traditional, teaching material, but they require well thought out, studious and long-term team work. In programmed teaching materials are carefully empirically checked in order to aclieve their pedagogical efficiency, to be constantly confirmed and increased. That is why there are certain stages through which choice of programmed material should go as well as principles which are foundations of programming the above mentioned materials. Here we shall indicater briefly, only those requirements which hade been studied and which must be respected. In order to be successful programming should observe, according to lysaughtu and Williams, the following starting criteria [6]:

a. Programmer must thoroughly know material he wants to pro gramme.

b. The selected material should easily be professionally treated, and that is provided if scientific facts stated in it are relatively simple and generally accepted.

c. Teaching material should not be to long (for the beginning short themes are taken), but it would be necessary to satisfy relevant educational aims and time needed for learning to be reduced in reasonable time limits acceptable for majority of pupils.

d. In the programming process pupils difficulties in learning teaching material are taken into consideration,and where they have more difficulties programming itself helps them to over come them more easily.

e. Material where its consisting parts are based on clear and firm logic is more easily and more sucessfully planned, transformed into articles and sequences and fitted in the system of programmed material than such material which does not have firm logic connections

f. If care is taken during starting programming about special pupils needs as well, better success of pupils is aclieved and more strongly are stimulated their interest for programmed learning.

Lysaught and Williams (1988) also consider very impotant for successful programming to collect information about pupils, to separate clearly what is relevant for work with them and to take it as starting point. The following should be known about pupils: intelligence, knowledge, level of reading skill, results of diagnostic tests, teachers grades, social-economical condition of pupil's family, nature of wider surroundings from which pupil comes (village, small place, town) and degree of pupil's motivation for teaching work. Knowing these factors will helg: to include more reality in programmed materials, to provide enough flexibility in them and to be as close to young man as possible..

Fig. 1 Educational software

In selection of teaching material, according to Vladimir Mužić, (1985) it would be worth while to observe these general requirements [6]:

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a. In selection of teaching material to be programmed it is ne cessary to have in mind the fact that all parts of teaching contents are not equally suitable for programming and for making a programmed textbook.
b. Programmer is obliged to define operative programme tasks in such a way that they are clear, precisely enough, realisable in normal conditions and defined time intervals.
c. For successful following the process of programmed textbook realization or material it is necessary to make and test instruments for control of success.
d. Success of programming depends on the degree of knowing pupils abilities and knowledge, their social-economical status and degree of motivation for work.
e. Detailed analysis of teaching material makes possible its successful synthesis and optimal steps of its learning.
f. Organization and systemetization of teaching material make contribution to working out a graphic survey of the order of learning the material, elements of mutual actions of its cer tain parts, factors of positive and negative transfer, etc.
g. A lot of expert knowledge, skill and cleverness is needed to prepare carefully articles, classified in sequences, and sequences „be logically included in programme'as a wider entity.
h. Review of programmed material or textbook is written with the aim of raising its quality, degree of applicability and practical efficiency.
i. Each programmed material and textbook must be tested in the processessof so called clinical implementation with revision.
j. Finally, instructions for implementation axe made, preparation for mass usage and in the end comes realization of programmed textbook or material.
All requirements, we have spoken about so far, are set in order to select in an expert way teaching contents, based on suitable pedagogical-psychological factors, to be adjusted to interests, needs and ablities of young people, to provide their activity, to make possibilities for pupils to realize their own speed in learning, advancement ill phases, active participation in teaching work and proper development. Besides, basic principles of pro-gramme making require its careful studying, being professionally and empirically composed, tested as long as its reliability is confirmed, and after that to be constantly controled. From what we have said so far it is evident that great attention is paid to selection of teaching material and its programming, and it is very important phase of work in“ programmed teaching which conditions all subsequent phases and essentially predete rmines their courses and results. [5]

3. Is supervised learning efficient ?

In Russia principles amd methods of logic structure of teaching contents and their tasks are being thorrraghly studied, as well as psychological strucute of teacing material presentation, dosing of teaching material and tasks, algorythm of operations and learning systems, forma and methods of teaching material learning and way how it can be corrected. This research results will help: us, when they are completely published, to have better insight in to programmed teaching effects. Still, there are areas of educational activity where programmed teaching has shown certain advantages over some traditional forms of teaching and learning. It makes possible to precise and empirically cfeeeh contents of education with most details, to adjust their reali-zation to individual abilities, speed, ways of work and psychological characteristics of pupis to a maximum, to earry out realization in gradual logically connected series in which learning of one part (previous) is condition for learning the follo-wing, to provide necessary connection from pupil to teahher, his connecting work results with undisturbed [6]. Advancement in work as well as more active participation in learning process.

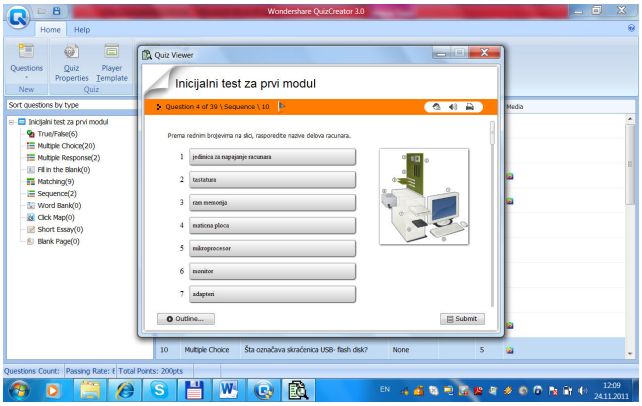

Fig. 2 On-line testing

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Thanks to this, it is possible to respect didactic principles in teaching more consistently, more secure control of teacher and pupils work. In conditions of programmed teaching detailed insight can be made in to work of each pupil, his activity be followed more easily, intensity of activity and participation la iteaeiiiag; be measured; this teaching rather well satisfies needs and interests of young people, it allows edvancement in accordance with their strenths and abilities; there are some general conditions for full motivation of pupils (specially by feedback information), acquiring of selfconfidence and responsibility is made possible; good conditions are made for selfeducation and for forming convinction with pupils that on their work depends what they will be in future. All this, no doubt, contributes to rationalization and intensification of teaching. [1]

Some experts of teaching in the USA have claimed that programmed teaching, by giving possibility to pupil for self education and selfevaluation, will push out teacher and make him, to a certain degree, unneeded, and it will make revolution in teaching and make pupil as independent creator.

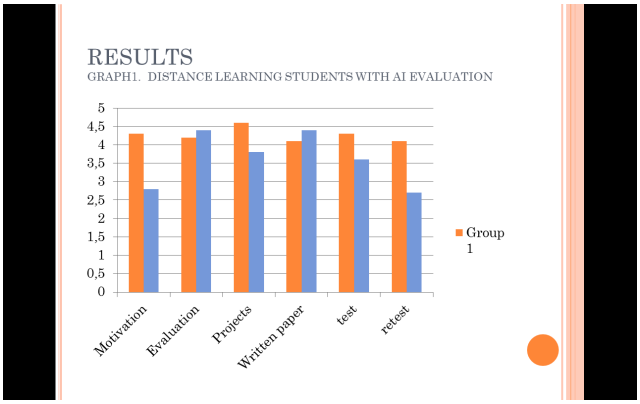

Fig 3. Complex students work evaluation

Researches have shown that supervised teaching, thanks to its technical base and the function it has, changes role of teacher, but can not replace him. Teacher is, in conditions of well thought out organized programmed teaching, mostly organizer, planner, somebody who directs, researcher, verificator of pupil's work and educator, not a walking and speaking textbook and living encyclopedia. Those who look at programmed teaching results with great optimism claim that it assmres scientific organization of pedagogical work, satisfies logic of learning, opens new learning possibilities, stimulates pupil's activity, provides advancement at his own speed, makes teaching more attractive, provides economy and efficiency of teaching and therewith belongs to such kind of teaching which is most suitable to needs and interests of yound, people. The newest researches, although do not deny attractivity and efficiency of programmed teaching, indicate that here also, in appraisals, more steadiness and flexibility should be shown. Still, programmed teaching nowadays is not fashion any more, but one of serious scientific problems of present and future education.. Researches about advancement of pupils in learning definitely show that it, among other things, depends on conditions for learning, quality of learning and on the person who learns. ented. Generally speaking, researches show, that a well done programme, logically composed articles and sequences, give good results both in teaching that is dominanitly programmed and in situations when programmed teaching complements other kinds of teaching. [4]. Researches have also shown, that pupils in the worst case, learn as much teaching material as they would learn with other kinds of teaching, provided they spare time in the process of programmed teaching and enjoy more in learning programmed materials. Teachers as well become convinced that programmed teaching when connected with other kinds of teaching is an attractive and useful innovation. They offer resisstance only when all advantages of programmed teaching are not clear to them and when they are not trained to conduct it. If importance of programmed teaching is overstrssed, if it becomes dominant, its own aim, if programme is too rigidly stated and formalistically realized it can also have negative consequences. [7] They are, among others, the following: planning of work is too much detailed and formalized, it is lived in illusion that perfection is acieved therewith; universal recipe is giverr for learning, then mechanical learning is encouraged to a certain extent because pupil is not able to see the whole road along which he comes to knowledge; sometimes all individualized manners of learning are not evident enough; there is fear that learning might be turned into specific sort of drill; there is danger that degree of being informed becomes more important than development of creative mental abilities, where creativity might be sacrificed for

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routine; some kinds of programmes, sucha as linear, may, under certain conditions, cause boredom, there is danger of automatization and mechanization of teaching material and learning presentation; in some cases, material side of teaching is overstressed; educational effects are not used aufficiently which it is offering and therewith unity of education and teaching is disbalanced. Besides, programmed teaching sometimes pushes out collective forms of work; it is more difficult to be conducted with children in begiemomg grades (although it gives higher effects with children of younger age than of older age); it does not give, at least up to now, not even similar results in all teaching subjects; it is difficult to provide integrity of various subjects knowledge; to a certain extent it lessens possibility of cooperation and mutual help among pupils, while in some cases it unnecessarily exclude teacher from activities where he is needed. [4] On the other hand, for composing, verification and implementation of programme a lot of effort is necessary, as well as material investments and pedagogically qualified personnel, and it is difficult to provide all this. For that reason many programmes, which are criticized now, are not composed professionally enough, they are not tested in practice by authorized experts. Anyway, programmed teaching is still relatively new, still not studied suficiently and. therefore many critical remarks should be taken conditionally, same as some results it had shown should be taken conditionally. It is sure that all weaknesses of programmed teaching, we have been talking a,bout so far, will not be shown in practice if it is organized professionally, logically brought into connection with other forms of teaching and learning and reduced to real possibility limits. Learning machine will not find the way by itself how to react in situations which had not been anticipated and will not think instead of methodologist what he himself had not thought about or formulated incorrectly.

4. Conclusion

Without great results of empirical researches it can be concluded that programmed teaching frees teacher, to a certain degree, of routine teaching and some drills, tutorship, correcting of tests and some homeworks; he has more possibilities to advance professionally, to do creative work, research in teaching, solve educational problems, realize educational work programmes and to be more socially engaged in his community. In this way teacher has more time to plan work for a longer period, to do reseach in the work process, bring into it necessary innovations and enrich it with his creativity. Besides, programmed teaching sometimes pushes out collective forms of work; it is more difficult to be conducted with children in begiemomg grades (although it gives higher effects with children of younger age than of older age); it does not give, at least up to now, not even similar results in all teaching subjects; it is difficult to provide integrity of various subjects knowledge; to a certain extent it lessens possibility of cooperation and mutual help among pupils, while in some cases it unnecessarily exclude teacher from activities where he is needed. On the other hand, for composing, verification and implementation of programme a lot of effort is necessary, as well as material investments and pedagogically qualified personnel, and it is difficult to provide all this. Landa says about limits and powers of programmed teaching: „Programmed textbook or machine will not know how to react to an error which is not foreseen by programmer. Learning machine will not find the way by itself how to react in situations which had not been anticipated and will not think instead of methodologist what he himself had not thought about or formulated incorrectly. In order that a machine can operate, exact instructions are needed how to act in various situations, analgorithm of acting is needed“. (69, p. 166). For that reason methodic and pedagogical training of teacher is more important when using programmed textbook or programmed macine than when contents and methodic instructions for teacher are written to realize them by himself. Pedagogical power of machine is as preat as pedagogical wisdom of its programmer.

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