

MOVING FROM “FLOOD OUR SCHOOL” TO “ISLANDS OF SUCCESS” — CONCEPTION IN THE PROCESS OF ADVANCING UNDERPRIVILEGED CHILDREN¹

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Abstract

Policy makers in education do not perceive the education system as a unique discipline, but rather judge it using terms appropriate for the world of economics. Methods of analysis and decision-making that exist in the world of economics are implemented in the field of education. This reality was the basis for our research on the integration of technological systems for the advancement of students. It became clear that in order to succeed in the process of integrating innovative technological systems in the schools we should not “flood the schools” with technology, but should use the “islands of success method.”

Introduction

In this paper we will present a model for the effective integration of technologies in education. The model was developed by our research team and is based on knowledge which we accumulated within the framework of studies which we performed over the past decades with the aim of successfully implementing technological systems among children from underprivileged populations.

Over the course of time we saw that the viewpoint that claims that schools should be flooded with innovative technologies in order to enable successful integration of technologies in education causes more harm than good, and in practice delays the implementation of technologies in schools. Processes of change in education must begin with an understanding of the needs and a clear definition of concrete educational goals. A teaching method should then be designed according to the constraints, such that it combines technological abilities and enables the successful achievement of these goals. We do not flood the school with technology, but rather afford an appropriate solution for each goal via technology and examine how the change affects the field. Implementation technology is not

¹ This paper is based on results of our research published *Process of Change in Education: Moving from Descriptive to Prescriptive Research* (Baruch Offir, Nova Science Publication, 2010).

the educational goal — it is a tool for the achievement of educational goals, a tool with which we can help teachers succeed in achieving the pedagogic goals they face.

Research has demonstrated a relation between the level of learning in schools and universities and a country's strength (Giddens, 1998). A relation also exists between education and the level and quality of life. Education today is a significant factor for ensuring society's existence, development and prosperity. However, major cities can afford students an opportunity to acquire knowledge more than cities found in the periphery. A gap therefore exists between the level of learning in major cities and the level of learning in peripheral settlements. Students with high learning abilities who live in the cities can participate in university courses and other learning centres, whereas students with high learning abilities who live in the periphery do not have a framework which can afford them knowledge in accordance with their talents and abilities.

This reality was the basis for our research on the integration of technological systems for the advancement of students towards academic studies. Our research aims to investigate how technological systems can be used to advance populations of students who live in distant areas, to afford them the opportunity to learn academic courses and to be university students while attending high school (Katz & Offir, 1991; Offir et al., 1993; Offir & Katz, 1990).

Proper integration of technological systems in order to reduce gaps between populations is very complex. Its successful implementation depends on the understanding and control of numerous diverse and complex parameters. We should not flood the schools with technology. Rather the "islands of success" conception should be used and technologies should be implemented in defined places, within limited frameworks, such that the factors that influence success can be examined, evaluated, and quantified (Offir 1987, 1988, 2000; Offir & Cohen-Fridel, 1998).

A proper combination of this means during the learning process requires a change in the teaching method. It must take numerous educational and pedagogical factors involved in the process into account. It must recognize the teachers' and students' personal attitudes, must evaluate the student's level, analyse the sociological processes taking place in the classroom, formulate an appropriate teaching method, and recognize the teacher's position and status in the classroom, etc. (Offir, 2000; Offir & Lev, 1999; 2000; Offir et al., 2000; Offir et al., 2002; Offir et al., 2003, 2004).

In our research we tried to identify and define variables which may help describe the process of integrating technology in learning and have implemented the conclusions reached from the research data. We examined the interrelations between these variables which comprised the basis for a model which enables more effective assimilation of technological systems in education.

Research that examines the integration of technological systems in teaching begins with descriptive research whose aim is to evaluate, measure, and identify the existing components and variables. The next stage, of carrying out prescriptive research, is then carried out based on data obtained from the descriptive research. Within the frame work of this stage of the research, we examine the effect of changes that can be generated in the variables in a controlled manner.

History of the Relationship between Education and Economics

The symbiotic relationship that exists between economics and education is as old as human history. The trend of education until the modern period in which we live was to serve the economy. During the “Agricultural Period” there were no schools, because there was no need for them. The son learned the agricultural work from his father and the daughter learned her function in running the household from her mother. Education and economy were intertwined in everyday life.

Later, during the “Industrial Revolution” which took place in the 18th century, schools were established near the industrial factories, mainly in order to watch over the children so as to enable the parents to work long hours and to enable the teachers to train the students for future work in the factory. The ‘educational’ approach in the school was to impart the students with habits of discipline and willingness to obey. The teaching method was learning by heart, which does not require thinking on the part of the student, but rather perseverance and self-discipline, thus training the students and shaping their willingness to stand by the production line and carry out the same action for long hours, without rebelling.

With the emergence of the “Age of Technology” economists were of course asked to calculate how many computers will be required for massive integration of computers in the education system. Many believed that education is a promising market for computer systems and that for this purpose planning must be carried out in order to construct a computer suitable in terms of its cost and the functions it can fulfill to effectively serve the education system, i.e. to sell as many computers as possible. Economists calculated the growth in the number of computers in the schools: if the price of computers will decrease by X during the next thirty years, the education system will integrate Y computers during this period. Reality after thirty years demonstrates that the price of computers decreased several fold X, whereas the number of computers in the education system did not grow according to their calculations. It was economists, not educators, who were consulted on the expected development of the education system. In spite of the great belief in the economists, they did not correctly predict the changes that took place in the education system using the models at their

disposal. The economic models were not effective in calculating processes related to the education system. However, who knows what they decided, who remembers their failure?

Today, in the “Generation of the Development of Electronics”, the economy needs ideas and the encouragement of original thinking. The state profits from the production of new instruments and means that did not exist in the market previously, and therefore more memory, faster, shinier, easier, higher, are the things that are sold and lead to economic welfare for the producing country. For this purpose we need to educate the students to original and creative thinking, excellence, discovery, invention and innovation. This is the reason for the invention of concepts such as “open school,” “individual learning,” “inquiry approach,” “the constructivist approach,” etc., which are all intended to create suitable conditions for encouraging individuals to express their talents and abilities. Thus, throughout history, education was shaped and its approach changed by external factors, by economic needs, in order to meet the demands of industry. Education was not an independent discipline, and did not develop a leading approach of its own.

In spite of the importance of the education system, it is not developing according to the needs of society. Many fields have undergone a revolution with the development of computers and electronics. However, the field of education was left behind, and did not undergo rapid development. Why is the relation between academic research and the development of the field less effective in education? Policy makers in education, society and its leaders apparently do not perceive the education system as a unique discipline, but rather judge it using terms appropriate for the world of economics. Methods of analysis and decision-making that exist in the world of economics are implemented in the field of education. Policy makers believe that the worldview and approach that apply in economics are also true for education and that the concepts of “cost” and “benefit” can also be the sole instruments for analysing, discussing and reaching conclusions in the field of education. Accordingly, it is easy for us to discuss the number of students in the classroom, the percentage of students who pass the examination or the teachers’ wages. It is obvious that these data are important. However, should they comprise all of our metrics?

“Flood Our School” — Theory and Implementation

In the beginning, it was believed that “flooding the school” with technology would lead to a change. It was believed that flooding the schools with new technology would lead to the successful implementation of the new technology in many of the schools in which the technological systems would be integrated. These schools, which implemented the systems successfully, would comprise an example and model for others to use advanced technological systems, and the technological systems would thus become part of the school framework.

However, as mentioned, it was found that although the price of computers decreased drastically, and although many schools purchased computers, use of technology within the framework of the education system did not progress at the expected rate.

Our researches have demonstrated that the flood-the-school approach was not successful. This is because many data unique to education systems were not taken into account when formulating the theory and when analysing and reaching conclusions on the integration of computers in the teaching process. For example, when flooding the schools with innovative technology there will indeed be schools that will implement it effectively and will be successful. However, many schools will implement the advanced technological systems in an unsuitable manner and will therefore fail.

We have found that the effect of failure is stronger than the effect of success in the absence of a tested and proven method. As claimed in prospect theory (Kahneman & Tversky, 1979), the subjective sense of failure of schools that fail in the implementation of these systems will be greater than the subjective sense of success of schools that succeed. Thus, if an organization must decide whether to implement a new technological system and it has two examples, one of an organization that succeeded in implementing the system and the other which did not succeed, the influence of the organization that did not succeed will be stronger than the influence of the organization that succeeded. It may therefore be assumed that the deliberating organization will not implement the new technological system. There will therefore be more failures than successes in the process of implementing the technological system.

Success in implementing technological systems causes the dissemination of the decision between education frameworks to implement a technological system. The dissemination of the positive decision exhibits a geometrical progression. On the other hand, failure in implementing technological systems causes the spread of the decision between educational systems not to implement a technological system. The spread of the negative decision also exhibits a geometrical progression. Therefore, the approach of “flooding the school” with computers will result in the creation of a greater number of islands of failure than islands of success. The rate of the spread of a negative attitude towards the implementation of technological systems will be higher than the rate of the spread of a positive attitude, such that the negative attitude will prevail and the implementation of new technological systems will fail.

The initiators of the flood-the-school approach did not take the unique characteristics of the learning environment into account, as opposed to the economic environment. Learning environments have rules for discussion and decision making that differentiates them from commercial environments. Our research has shown that the process of the decision of whether to implement a new technological system within an education framework is related not only to

prior experience but also to the personality of the person making the decision. There are people who will decide on a change or innovation only if success is ensured and others with a different personality who will decide to implement a new technological system even when the success of the implementation process is less clear and sure. A positive decision to implement an innovative technological system also depends on the extent to which people are willing to take risks, where it is clear that if they are successful the gain can be significant. We therefore reached the conclusion that the process of reaching conclusions and making decisions within the framework of the education system should take the environment in which the technological system is implemented and the personality and attitudes of the teachers and students into account.

We must therefore admit that whereas in the past education did not need models for making decisions, today education must develop models for making decisions that will be different from the models used in economics, because the education system differs from systems in other fields. Indeed, the education system requires a unique conception of its own.

Academic Research and its Contribution to Consolidation of Models for Decision Making in Education

The main culprit for the current situation is the academic world. Researchers in the field of education did not succeed in presenting a convincing applicable model for collecting data, making decisions and effectively managing modern educational systems, a model that meets the demands of the education system. The ability to implement is an important condition in the evaluation of academic research. Research should be carried out by a team of researchers who need to sell their method to the school, i.e., present the school with a convincing, well-formulated and reliable approach, interest the school administration, increase their enthusiasm for the concept and their willingness to implement it in the system. The researchers must adjust their program to the needs of the teachers, principals, teachers and students and win their cooperation and support, so that such a research program will actually be carried out, and to increase the chances of its implementation in the school.

The research results will help formulate and define a new variable that will represent the behaviour rules of the 'consumer' within the education framework. This factor will be an educated combination of all the factors that motivate the system, and its value will be unique to the field of education.

Change and reform in the education system are not possible without the agreement and cooperation of the role holders in education, the parents who represent the students' interests and the policy makers in the schools. Change in the education system is complex, slow, requires extensive knowledge, experience,

adjustment, and full cooperation among all factors, and is compatible with the understanding, experience and worldview of the workers of the education system who are interested in change.

The teacher and the principal are at the forefront of the encounter between the student and society. A unique complex task is placed on their shoulders. Even without the intervention of non-professional external factors, the education system has two main goals, which are not always complementary. The first is to educate, impart values, impart the students the ability to judge, manage their lives and their direction. The second is to impart knowledge and skills to the students, train them to have the ability to contribute to their society.

A great number of teachers chose this challenging profession out of choice and a desire for self-fulfillment. They understand education, and are the ones who should become the catalysts for reform. Society (including academic research) must give them the tools, support and power to succeed in the task which they took upon themselves. Since the teachers' abilities to cope with the tasks they face in the absence of time and resources are limited, we must develop research-based teaching methods that will answer the question of which tasks we can take off the teachers' shoulders. We must identify where we can help the teachers by the proper assimilation of advanced technological systems, and thus enable the teachers to focus their efforts on carrying out complex tasks that can only be carried out by a flesh and blood teacher. Therefore, any change or reform will be carried out successfully only with the full support and cooperation of the teachers.

This insight led the research team to focus on teachers, and is why we have been collecting data on the pedagogic and personality traits of the teachers for the past 20 years. For example, in one of our latest studies we examined the differences in the teaching style of teachers who teach in different teaching environments. Multivariate analysis which examined three teaching style-measures simultaneously as a single entity indicated a significant difference between the research groups, $F(6,628 = 4.09, p < 0.001, \eta^2 = 0.04)$. Table 1 presents the corrected means, standard deviations, univariate analysis results and size of the effect of the teaching style measures according to three teaching environments.

Table 1: Means, Standard Deviations, F and η^2 Values of Teaching Styles According to Teaching Environment

Teaching style measures	Teaching environment							
	Distance – complete (n=66)		Distance – mixed (n=94)		Traditional (n=160)		$F(2,316)\eta^2$	
	M	SD	M	SD	M	SD		
Personal attention	2.93	0.13	3.26	0.10	3.24	0.08	2.52	0.02
Flexibility	1.81	-.13	2.02	0.11	1.48	0.08	8.63*	0.05
Encouraging atmosphere	3.79	0.11	4.00	0.09	3.92	0.07	0.96	0.01

Note: The scores ranged between 0–5. A higher score indicates that the teacher's style is more focused on the student.

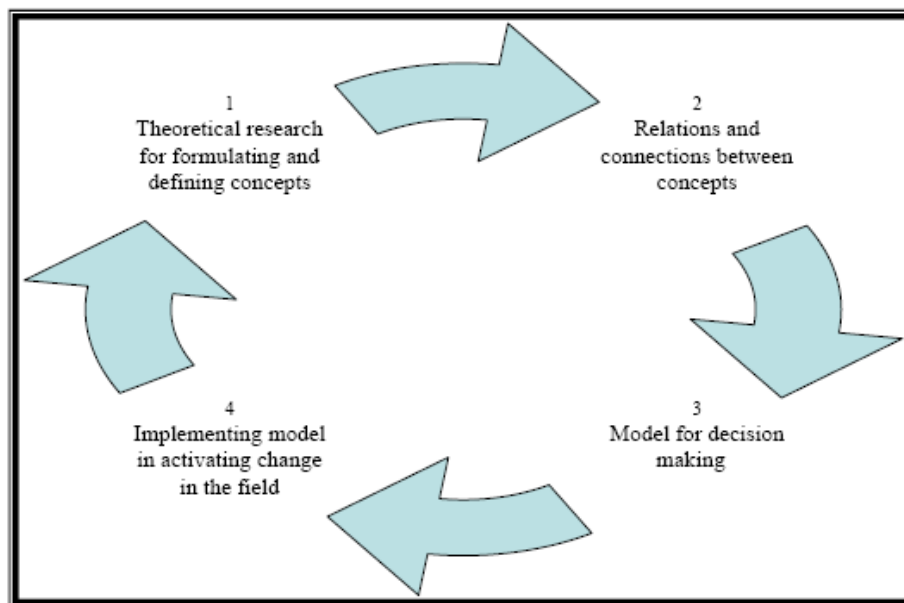
* $p < 0.001$

As indicated by Table 1, teachers who integrate elements of distance teaching as an integral part of the course they teach have a significantly more flexible teaching style than teachers who teach in a traditional teaching environment. This datum, which joins the data on teachers' characteristics, helps us formulate a decision making model for implementation of technological changes which takes the pedagogic aspects of the person who is responsible for pulling the train of change into account.

Over the years, we have found that the data which we collect must serve us for constructing a model which contains four measures that will enable defining the goals of education, the most suitable methods for achieving the goals, deciding the teacher's contribution to achieving the goals and the most effective means that may help the teacher achieve the goals.

It became clear that in order to succeed in the process of integrating innovative technological systems in the schools we should use the method of "islands of success," and should implement technologies in defined places, within limited frameworks, where the factors that influence success can be examined, evaluated and quantified. These data helped us expand this success and transcribe it when activating the change in learning systems. The course of the implementation of change is from an island of success, i.e. success in a limited area, to complete success. Thus, educational research will supply an instrument by whose means it will be possible to analyse, discuss, reach conclusions, and direct the education system towards a real contribution to society. This will not be a revolution. Rather, it will be a slow, controlled change, with preservation of complete harmony between all factors.

Figure 1: Stages in Implementing Change in the Field of Education



The theory of islands of success is the product of researches that were performed over the past years by our research team. The research method is “action research” where the research is a field research. The research results are examined by their implementation in the field. The success rate that was measured after implementation of the research results indicates the extent to which the research results are accurate and reliable. If indeed the system improves in achieving its defined goals as a result of the implementation of the conclusions, this is a sign that the results referred to elements that inhibit success. The effectiveness of the system is tested in the field again and the research results are again implemented.

The fact that failure in implementing a technological system has a greater influence than success led to the conclusion that we must construct a system in which the number of failures will be minimal. The smaller and more limited the system, the easier it can be influenced and the easier it is to control and isolate parameters that generate failure. Prevention of a situation of failure will increase the chances that the implementation of the technological system in the organization will be carried out successfully.

As implementation of the system will expand; there will of course also be failures in schools in which the implementation of the system did not succeed. However, failure is less significant as the system spreads. When one school succeeds in implementing the system and another school fails, the influence of the school that failed is greater. However, as the system spreads the influence of the school that failed will decrease. We must therefore ensure success, especially in the early stages of implementing the system. The influence of the teacher’s personality will also decrease, with increases in success.

The common flood-the-school approach led to hundreds of schools trying to implement technologies in education. Because of the numerous innovative systems in the field, it was impossible to control and direct the activity of the system and thus prevent failures. This fact caused numerous failures. Thus, the influence of failure is higher than that of success and our ability to control this development has decreased. This has led to an almost certain failure. This reality led us to the decision that we must construct a system that will ensure a minimal number of failures, i.e., will ensure success!

Such a possibility can be carried out if we invest the manpower and resources at our disposal for coping with the implementation of technological systems in a limited field that can be controlled, directed, and which enables rapid and effective intervention for preventing mistakes and ensuring even more success. For example, implementing the system successfully in a single class will create more successes and the number of successes will increase in a geometrical progression.

The islands-of-success approach will lead to the successful dissemination of the technological system in learning and education frameworks. This approach is

based on the assumption that decision making is subjective. In the decision-making process, the rational human being acts according to the realistic chance which is a linear line on a graph where one axis is the objective probability and the other is the subjective probability. In practice, the subjective feeling makes a greater impact on the decision-making process. People tend to exaggerate data that indicate failure more than data that indicate success.

It is impossible to base decisions on a purely rational basis. Failures in the decision making process are caused by various misleading factors, factors that impair our ability to make an objective decision. Thinking is usually stereotypic and our tendency is to search for justifications. For example, people ignore the prevalence of a certain phenomenon in the general population if it appears in groups which are very familiar to us. We also afford greater esteem to examples which come to mind quickly and easily than to other examples. A particular decision is made because it is more easily available to memory and is easily retrieved. Finally, different formulation and presentation of the problem will lead to different decisions. Hatred of failure is higher in man than the desire for success (Aflalo & Offir, 2010; Offir, 2010).

Conclusion

Decision making that is based solely on economic models does not meet the needs of the education system. The education system must develop models for analysing processes and making decisions which are adapted to the education system and are based on data that were collected by educational research in order to properly implement technological systems with the aim of reducing gaps between populations. Their successful implementation depends on the understanding and control of numerous diverse and complex parameters. The schools should not be flooded with technology. Rather the islands of success conception should be used and technologies should be implemented in defined places, within limited frameworks, such that the factors that influence success can be examined, evaluated and quantified.

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