The challenge for the education of mathematics is an extremely rapid development of knowledge and technologies related to its teaching. Continuous education is an effective way to help teachers to adapt to rapid changes. ROSE as a learning community that is involved in teacher enhancement, is trying to face this challenge. From the perspective of the Regulatory Theory of Social Influence, ROSE is a distributed information processing system. The rules of functioning of this community: high level of trust, focus on cooperation and internal motivation allow it to optimize its operation by delegating specific activities to the people who have the highest qualifications and the greatest opportunity to accomplish them.

CHALLENGES FOR EDUCATION RESULTING FROM THE RAPID PACE OF SOCIAL CHANGE

We are currently living in a period of fast-moving and accelerating changes. To a large extent, this is the result of an extremely rapid development of information technology and communication. Internet, social networks, mobile technologies, sensors, the development of artificial intelligence and the Internet of Things radically change the environment in which people live and work. This affects both access to information and communication methods. The magnitude and speed of these changes is a huge challenge for education. Hence, the question arises how to make education keep up with the changes taking place in today’s world? Two basic aspects of such a problem can be distinguished: firstly, how to keep the content that is being taught up to date, and secondly, how to incorporate into teaching emerging new tools and technologies.

Traditional ways of teachers’ education are inadequate. Before a teacher finishes his or her studies and starts teaching, methods and tools that he or she has learned in his or her studies are already outdated. A partial solution to this problem is training for teachers introducing...
new methods and teaching how to use them. Unfortunately, the pace of changes taking place, quickly makes the knowledge acquired during training obsolete. New technologies and tools are emerging, as well as new knowledge is being created which teachers should be able to teach to students, so that they can use it in the world in which they will enter after finishing school. A single training is usually insufficient. In turn, a recurring training cycle may be a solution for updating knowledge only to a limited extent. The changes taking place are usually multi-faceted, complex and unpredictable. Traditional structures of education, managed in top-down processes, are not suited to rapidly changing knowledge.

An effective way to adapt teachers to ongoing rapid changes is to create a process of continuous learning. Such a process is much easier to create in organizations and associations existing outside the official structures of education than to plan it as a top-down process. This is because adaptation to fast-changing conditions in education takes place much more efficiently in structures dominated by bottom-up and horizontal processes such as professional learning communities (Stoll, Bolam, Mcmahon, Wallace & Thomas, 2006). In such communities its members, in this case teachers, independently absorb a part of knowledge and learn from one another. Although, this process is much less formalized and controlled than traditional teachers’ training, it is usually more effective, allows for more innovation and more efficient adaptation (Hord, 1997; Fullan, 2001; Hord, 2004).

A lot of knowledge has been accumulated about how to create traditional institutions and how to manage top-down processes (e.g. Vroom, 1964; Lawrence & Lorsch, 1967; Porter, 1968). Many centuries of experience have taught us how to set up schools and how to administer them. Much less is known about how to create professional learning communities and how to manage them (compare Kocurek, Soltysińska, Świeży & Wachna-Sosin, 2012). In this article, on the experience of the ROSE teachers’ community, based on the Dynamic Theory of Social Influence (Vallacher & Nowak, 1997a; Vallacher & Nowak, 1997b), The Bubble Theory of Social Change (Nowak, 1996) and Regulatory Theory of Social Influence (Nowak, Ziembowicz, Zablocka-Bursa & Bartkowsi, 2015) we will try to formulate the basic principles of creating and describe the principles of functioning of the learning community operating in the field of education. The two authors, (KWN and AN), planned the rules of creating ROSE, participated in ROSE activities and meetings from the very beginning, therefore, information about ROSE comes mainly from participatory observation.

WHAT IS ROSE?

ROSE or Regional E-learning Training Centers was established thanks to the Telekomunikacja Polska grant as part of the TP Edukacja i Internet initiative awarded to the SWPS University in 2004. It was an attempt to answer the need to increase competence in the use of the Internet in education. In contrast to many similar projects, the principles of ROSE’s operation were based on the theory of social change. The starting point for the idea was the observation that often IT teachers who participate in many professional training courses conduct lessons in a very traditional way, without using the knowledge and skills they acquired during the training. Often, the training itself instead of arousing passion gives rise to frustration. After returning to their school, often teachers were not able to introduce in their classes, what they had learned during the training. It was caused by the fact that school’s culture was not ready for the change, just one teacher with head full of new ideas was not enough to change
minds of rest of the teachers. What was needed for training to transform it into a change in the teaching method was to move away from thinking in terms of teacher enhancement, and to treat this process as a social change in the area of education (Nowak, Winkowska-Nowak & Rycielska, 2009). It is not teacher who needs to be trained, but rather the culture of teaching in the school that needs to be changed. Thus, the subject of the change was the school, not the teacher (Zabłocka-Bursa & Nowak, 2015a; Zabłocka-Brusa & Nowak, 2015b). The general principles of how to introduce changes in schools were derived from the Theory of Bubbles (Nowak, 1996), and detailed indications were elaborated on the basis of computer simulations of this theory (Nowak, 1996; Nowak, Kuś, Urbaniak & Zarycki, 2000).

THEORY OF BUBBLES AS THE BASIS OF CHANGE IN EDUCATION

Computer simulations have shown that for a lasting social change it is important that this change begins with jointly acting innovators who can convince others and oppose the majority pressure (Nowak & Vallacher 2001). According to this theory, a single teacher despite the training has very little chance of introducing newly acquired knowledge or implementation of new tools. Although, after completing the training, he or she may be strongly convinced of the need to change, however after returning to school there is a good chance that he or she will change his or her mind and will adopt a majority’s attitude. The situation improves when there are several teachers with urge for change and who cooperate with each other.

The ROSE network was based on results of computer simulations mentioned above (Nowak & Vallacher, 2001; Nowak, Kuś, Urbaniak & Zarycki, 2000) and Theory of Bubbles (Nowak, 1996). It was decided that for a teacher to be qualified for a training at least two other teachers from the same school should also participate in the training. IT teacher needed to be among the three. This last assumption was necessary to ensure that all participants after returning to school will be able to use computer equipment and have access to an IT expert. Secondly, from each training, which was attended by an average of 60 people, only teachers from a few schools were invited to continue to participate in the creation of the ROSE network. By selecting the most motivated and most active teachers we tried to create a network of potential innovators. After each of the trainings the number of schools in the network increased by a few schools.

Computer simulations (Nowak & Vallacher, 2001; Nowak, Kuś, Urbaniak & Zarycki, 2000) also showed that for an effective change, it is very important that in the initial phase of change, when the bubbles are still small, the representatives of the “new” receive a lot of support from outside. As changes occur, when the “new” bubbles increase and there are more and more of them, external support can be gradually withdrawn and replaced with growing support from other “new” bubbles. SWPS University performed the role of external support. Initially, the role of the University was large, and the communication had the structure of a star, where the University was in the center, and the edges corresponded to particular schools. Communication occurred mainly between the University and each school, whereby the SWPS University had a leading role here. As the program progressed, the role of the University gradually decreased, but, cooperation and communication between schools developed. Increasing number of initiatives was initiated by schools and implemented in cooperation between them. As a result of trainings conducted by ROSE centers for other schools in their region, local support and cooperation
networks were created. This changed the structure of the network and reduced the leading role of the SWPS University (compare Winkowska-Nowak & Rycielska, 2009; Zabłocka-Bursa & Nowak 2015a, 2015b).

As a result, the network of teachers, mainly teachers of mathematics, from schools outside large urban centers was established. In 2006, when the funding was over, one could speak about a great success of this undertaking. As part of the ROSE, large volume of materials and many methods have been created for the use of Information and Communication Technology (ICT) in schools, 7 books have been published, and most importantly, many teachers and students have been trained. The very name ROSE has become synonymous with the method of introducing changes to education through social change.

The end of funding, however, did not mean the end of the community of teachers taking part in ROSE. This was possible due to the fact that engagement and cooperation based on internal motivation was a key characteristic for members of the ROSE community. ROSE has survived the interruption of funding, because it was intrinsic motivation, rather money that was the primary source of motivation to its functioning. Teachers’ will and their active participation resulted in decision to continue cooperation both with each other and with the academic side. In 2008, after two years of existence as informal network, the ROSE association was established, while in 2013, the foundation, which operates to this day, was created (Zabłocka-Bursa & Nowak, 2015a; Zabłocka-Bursa & Nowak, 2015b).

TYPES OF ROSE ACTIVITIES

As part of its activities, ROSE performs a variety of diverse and complex tasks. These activities have a different range, from activities conducted in the class to tasks at the international level. Activities in the class consist of introducing innovative teaching methods and tools such as Moodle e-learning platform, running a website, using an interactive whiteboard, introducing new software to didactics including GeoGebra, new technology and communication tools.

Activities at school level are mainly manifested through running school websites, management of the Moodle e-learning platform, and training colleagues in the use of Information and Communication Technologies (ICT).
Activities for the local school environment are mainly Small ROSE trainings, i.e. trainings for other schools in the local environment and local GeoGebra and ROSE conferences.

National activities include “the National GeoGebra conference”, “School in the Age of Internet conference”, GeoGebra courses, publications (including books and the creation of applets for the Pazdro Publishing) and participation in grants together with the University.

International activities are permanent or repeating. These are, for example, the EWCOME Conference, contacts and cooperation with a school in the United States.

ROSE AS A DISTRIBUTED INFORMATION PROCESSING NETWORK: THE PERSPECTIVE OF THE REGULATORY THEORY OF SOCIAL INFLUENCE

The main aspects of the ROSE can be described as a distributed information processing system. Its functioning consists of the perception of new discoveries and tools in the area of new information and communication technologies, assessing which is the most important for teaching at school and transforming this information into didactic materials (training, lesson plans, conference presentations and publications). Based on the Regulatory Theory of Social Influence, we will further consider the ROSE community as a distributed information processing system (compare Nowak, Ziembowicz, Zabłocka-Bursa & Bartkowski, 2015).

Regulatory Theory of Social Influence

Social impact is one of the most commonly occurring processes between individuals and therefore is one of the most frequently studied in social psychology. However, most research on this phenomenon takes the perspective of benefits for the sources of influence. In this approach, the impact is treated as a way of gaining power and control over others. It serves to achieve the goals and interests of the source of influence, and often even assumes acting against the interests of the object of influence. Typical examples of applications of classical theories of influence are: how to get a person to buy a product they do not need, or to be ready to vote for a party that does not pursue their interests (compare Ash, 1956; French, Raven & Cartwright, 1959; Sherif, Sherif & Nebergall, 1965; Milgram, 1974; McGuire, 1985; Petty & Cacioppo, 1986; Wojciszke, 2000; Cialdini, 2007).

In contrast to the classic social influence theories (compare Doliński, 2005), the Regulatory Theory of Social Influence proposes the perspective of the person to whom the influence is exerted (the target of influence). In this approach, being subject to social influence may be desirable and actively sought by individuals. Wishing to be influenced, people observe others and ask them for information and opinions. In this way, it is possible to use knowledge and information resources of the sources of influence to optimize their own functioning. In other words, from the perspective of the object of influence, the social impact increases the possibilities of functioning in the group, and indirectly – also the whole group (compare Nowak et al., 2015).

The Regulatory Theory of Social Influence explains how the active search for influence – at the level of individuals – optimizes the behavior of individuals and social groups to which they belong – by creating at the group level a system of distributed information processing. The rules of social influence, based on trust, validity of information and its coherence, determine whether an individual is looking for low-level, unprocessed information, or delegates the processing of information to others, accepting its results: conclusions and evaluations. This process results in the joint creation of a social representation. As a result, social impact
mechanisms allow for the optimization of distributed information processing among group members, because thanks to them, the group devotes its information processing resources to the most important issues, assigning them to the most competent units. However, it does not mean that less important issues are omitted. To each task appropriate person is assigned. Depending on the task and skills members’ roles might be change in between tasks. This mechanism organizes group’s members into a distributed information processing system.

The Regulatory Theory of Social Influence assumes the existence of three main factors that determine who and in what form the influential individual is ready to submit.

**Trust**
The Regulatory Theory of Social Influence assumes that the basic factor deciding on whom the individual is looking for is trust; individuals want to succumb to the influence of those they trust. Trust is compared to the lubricant that makes the engine work (Arrow, 1974) – it shapes the dynamics of the group’s functioning by helping people to enter into relationships. From an individual’s point of view, trust reduces the risk associated with other people’s actions and allows them to be predicted (Sztompka, 2007). We assume that the information received from a trusted person is true and that these people do not want to harm us.

From the making decision point of view, it is fundamental to answer the question whom, in what dimension and in what circumstances we can trust (Kramer, 2006). The difficulty of this task is caused by uncertainty about the nature of social relations in which a person functions. Often we do not know the motives, interests of the other side, it is difficult for us to assess its actual credibility. This leads to one of the fundamental dilemmas of human social functioning, namely the dilemma of trust (Kramer, 2006) – who can we choose as a source of influence, in whose hands we will give more or less important issues. In the dilemma of trust, decision-makers hope to take advantage of the trust placed in the other person, at the same time exposing themselves to the risk that their trust may be abused or betrayed (Messick & Kramer, 2001).

Trust has at least three basic functions: it makes social life more predictable, it creates a sense of community, and facilitates joint action (Misztal, 1998). People who trust each other do not lose valuable resources, e.g. money and time to develop control mechanisms. They rely on the opinions of others and act accordingly. Trust understood in this way has two dimensions: the conviction of the good intentions of the person and the belief that they will be able to provide information, and thus faith in their competence (Sztompka, 2007). The intentions of the person are more important and considered first. Then, if they are assessed positively, the question of competence is considered. Which dimension will be taken into account depends on the needs and circumstances of the person. Competences are taken into account mainly when a person goes to an expert, e.g. a lawyer, and on the other hand, the morality of the other person will be more important when, for example, a babysitter is sought. Our willingness to trust others changes over time: it develops or decreases, sometimes it expires. When a person seeking influence has high trust in the source of influence, he or she is ready to accept the opinions and acquire information from the source. Confidence is a factor that allows efficient and effective functioning by enabling people to search for other high-level, processed information. In the absence of trust, the influence is not sought, and if it is exerted, it encounters resistance and an attempt to reject it.

**Trust in ROSE**
In case of ROSE mutual trust is one of the most important resources. The community is based on the belief that other members
are trustworthy and ready to help. According to the Regulatory Theory of Social Influence (compare Nowak et al., 2015), this is the main factor of opening up to the influence of other people, and thus the readiness to cooperate with others. The relationship between trust and cooperation is bi-directional. Trust creates readiness for sharing and cooperation, and perceiving others’ willingness to cooperate increases confidence. It seems that according to the taxonomy proposed by Sztompka (2007) the most important dimension of trust for the functioning of ROSE is the intentional dimension.

The high level of mutual trust is also connected with the fact that ROSE as a community is not focused on competition, neither within the team nor with other communities and organizations. An important factor in avoiding the focus on competition within ROSE is that different tasks are carried out by groups in changing teams. Teams for the implementation of many tasks consist of teachers from various schools. This avoids the creation of “school” teams that could evoke competition between schools (compare Sherif & Sherif, 1953; Sherif, 1966; Brewer 1999). In addition, trust and cooperation are facilitated by the ROSE mission, that is, helping all teachers. It is also the case, that implementation of tasks at levels beyond the school and region facilitates favors cooperative orientation towards the external environment. In the course of carrying out these tasks, there is the opportunity to meet teachers from various schools, also from outside Poland. For example during workshops, the criterion of success is to help the development of another teacher rather than competition. These types of tasks also initiate cooperation between teachers from various centers.

Although, most of the communication between members of ROSE takes place online, meetings in the real world are still a very important element of the community function-
even by a person met completely by accident, and therefore not trusted. Moreover, a high level of trust is needed to ask for advice, lower trust is needed to request information.

**The importance of the topic in ROSE**
In ROSE, on less important matters, like implementation of tasks, the impact is usually sought at a low level, e.g. technical advice on the use of computer programs, Moodle, or ways to perform specific tasks. This is mainly the demand for information. However, in situations when influence at high level is needed like: setting directions, objectives or support it is expected from selected group members and, in particular, the coordinator. This is in line with the approach of the Regulatory Theory of Social Influence, which assumes that high-level information is sought from the most trusted experts, and for lower-level information a slightly lower level of trust is sufficient.

**Coherence of the message**
According to the Regulatory Theory of Social Influence, coherence of the message is one of the main factors determining the level of trust. With high coherence of communication, people maintain or increase the level of trust in the source of influence. With a poor cohesion observed, the level of trust decreases and people tend to check the information. The perceived coherence of the message and trust in the source of the message are interrelated. With a high level of trust in the source, the impact object usually does not check the consistency of the message, so the existing inconsistency in the transmission from a source of high trust is usually not perceived. On the other hand, the perception of significant cohesion prompts the individual to accept information at a higher level, and to submit to the influence of people not necessarily endowed with high trust, which leads to a gradual building of trust.

**Coherence of the message in ROSE**
The key characteristic of communication in ROSE is the coherence of the message. Although, members may disagree on particular issues, their understanding of goals at a higher level and the ROSE mission is the same. Consistency of the message allows the group to maintain a structure regardless of the current involvement of its members in specific ROSE tasks. Face-to-face, cyclic whole community meetings are crucial for building a common understanding of the values, norms and identities of ROSE. The discussion in the group allows members to define a common understanding of what ROSE is, how it works and what values it carries out. This becomes the basis of cohesion in Internet communication, which is the basic form of communication and cooperation in ROSE. Cohesion in ROSE is also fostered by the adopted strategy for creating a community. Accordingly to the Theory of Bubbles (Nowak, 1966), ROSE started its activity as a small group of teachers from several schools. In such a group it was easy to achieve a common vision and cohesion. In the following years other teachers gradually joined. The gradual and relatively slow growth of ROSE was conducive to maintaining cohesion, which could be at risk with rapid, high growth.

**Optimalisation at the group level**
The starting point for the Regulatory Theory of Social Influence was the observation that information and its evaluation create a low to high level continuum, where the low level usually corresponds to the premises, for example a description of facts, and high – to conclusions, or opinions and councils (Vallacher & Wegner, 1987). Individuals are looking for influence at different levels of this continuum, sometimes looking for information, and at other times – conclusions. The importance of the case, as well as trust and coherence are the most important
variables determining the level at which the influence is sought and accepted by the individual. The interaction of these three factors determines the level selection. The more trust and the less important matter, the more people are likely to seek influence at the high level. The more important the matter, the greater the level of trust must be in order to delegate the processing of information and accept the influence at a higher level. According to the Regulatory Theory of Social Influence (compare Nowak, Ziembowicz, Zablocka-Bursa & Bartkowski, 2015) optimization at the group level occurs when information processing is divided among group members. Trust becomes the basis for the division of tasks. The most important information and those of a strategic nature are processed by the most competent people, while not important are delegated to people with average competences. In this way, the group itself regulates the distribution of its own resources.

Optimalisation at the group level in ROSE
The ROSE community is characterized by specific task-sharing mechanisms. At first glance, they may resemble a project approach (cf. Kerzner, 2017), in which a team of people with appropriate competences is created for a specific task, which ends its existence at the end of the project. Unlike most project teams, ROSE did not end at the end of the project but only evolved into a social network, the specificity of which is that specific teams emerge from it to carry out new tasks. These teams work on individual projects or grants. The selection criterion is first competences but also possibilities to commit time and willingness to get involved. It must be remembered that teachers have other responsibilities in schools as well as activities in ROSE. The structure of emerging subgroups is usually quite similar. They consist of people recognized as specialists in a given field – experts, e.g., from GeoGebra or Moodle, and people responsible for implementation.

The roles of individuals change between tasks, sometimes a person acting as an expert in one project can be an executive in the other. This is related to the specificity of the distribution of competences in the ROSE community, in which members have complementary skills. In ROSE, the only stable role is assigned to the coordinator who sometimes invites individuals to participate in tasks or grants.

Summing up, the Regulatory Theory of Social Influence shows that trust plays a fundamental role in the processes of influence and delegation of information processing. People are ready to take influence mainly from the people they trust, especially in terms of high level processing. Such a strategy allows them to save their resources and reduce the risk of making mistakes. In addition, it does not adversely affect the effectiveness of decision-making and actions because the information is derived only from certain sources. On the other hand, lack of trust is an internal warning that leads to self-examination and evaluation through gathering and analyzing information at a low level – facts.

CONCLUSIONS
The intention of this article was to show, on the example of ROSE, the essence of trust in the processes of social impact and the delegation of information processing. It can be seen that as a result of the TP grant, the ROSE community based its functioning on dispersed processes based on trust in the intentions and competences of the members. From the perspective of the Regulatory Theory of Social Influence, it seems that this community is an exemplification of optimization of information processing at the group level. From the network of interconnected people from different centers, subgroups emerge for individual tasks, in which individual people perform roles consistent with their competences. Social impact mechanisms described
by the Regulatory Theory of Social Influence (compare Nowak, Ziembowicz, Zabłocka-Bursa & Bartkowski, 2015) organize members of the ROSE community into a distributed information processing system. Depending on the trust, the importance of the topic and the coherence of the message, members make a decision whether they are looking for a high level of influence (opinions, advice) or a low level – facts. In other words, whether they decide to delegate information processing, or are going to search for information and process it themselves.

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**ABSTRAKT**