

RESEARCH HIGHLIGHTS IN EDUCATION AND SCIENCE 2018

Editors

DR. OMER TAYFUR OZTURK

DR. WENXIA WU

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The Greek Co-teaching Model

Tryfon Mavropalias
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Introduction

The question of the placement of students with disabilities in some of the structures of Special Education is not an issue that has arisen now in the field of special education, but it has also been a concern for children, their parents and everyone else involved in their education. By the early 1990s, most special education services were provided with support programs where pupils with special educational needs attended general education classes but for some hours left their classroom to receive special education in special classes (Walther - Thomas & Carter, 1993). Research evidence shows that children in special classes may have problems such as: a) socially stigmatized; b) general education teachers were not responsible enough or the learning needs of pupils with special educational needs; c) there was often a lack of communication between general and special education teachers; d) students may not participate in school or class events because they were in the same class in the same class.

One way of providing educational services to children with special educational needs that are aimed at these problems is the implementation of co-teaching. Co-teaching is defined as an educational approach in which general and special education teachers collaborate, coordinate their efforts, co-ordinate, share classroom planning and management, in order to successfully achieve the goals set for all students, with or without special educational needs, who are in general education classes (Friend, & Bursuck, 2009; Friend & Cook, 2012). In particular, the aims of the co-teaching are: (a) Increasing educational choices for students; (b) Enhancing the social participation of disabled children; (c) Improving the school performance of students with disabilities (Mastropieri, Scruggs, Graetz, Norland, Gardizi & McDuffie, 2006).

According to Friend and Cook (2013), the features of co-teaching are as follows: (a) Classroom teaching is implemented by teachers with different specializations. In the realization of the co-teaching, the students are taught by two or more teachers with different specializations, where their roles during the implementation of the teaching are equal. One co-teacher is a general education instructor and has the responsibility of teaching academic courses in collaboration with a special education instructor or with a special education teacher who is specialized in a particular type of diagnosis (eg in teaching children with hearing or hearing impairment). (b) The co-teachers jointly share the responsibility of the teaching. Every teacher in a integration class where co-teaching takes place plays an important role, since he can coordinate and organize his teaching in such a way to enhance the learning choices of his pupils. In addition, Wilson

(2008) reports that co-teachers co-decide on the way of teaching and the teaching practices that will follow, ensuring their active participation in teaching and promoting the active participation of all pupils with and without special educational needs. The above could not be achieved if there was only one class teacher (Friend, Burrello, & Burrello, 2009 in Friend & Cook, 2013, p. 165). (c) In the general class, the student groups are heterogeneous According to Seglem and VanZant (2010), in the realization of the co-teaching, teachers provide teaching to heterogeneous groups of pupils consisting of children with special or non-special educational needs. This feature of co-teaching is also one of its advantages because it reduces the ratio of teacher / pupil and secondly there is a specialist teacher, enabling the co-teachers to respond to the diverse needs and demands of their students. (d) Teaching students with and without special educational needs is done in the same physical space. In the realization of the co-teaching, teachers work with all children in a specific room or in a particular room. This characteristic runs counter to past practices, where for example teachers grouped their students and each group was taught in a different room. (Friend & Cook, 2013).

Villa, Thousand and Nevin (2008) report what is not co-teaching. This is not considered a co-teaching when: (a) one teacher teaches and the other can prepare the educational material and the means that will be needed in the co-teaching, (b) when one teacher's opinion prevails in the decision making process, (c) (d) when one teacher teaches a subject or a unit and the next subject is taught by the other teacher (e) when one teacher teaches a lesson and the other can teach one another (f) when the ideas applied to what is to be taught and how to be taught come from only one teacher and (g) when the role of the supervisor is assigned to one educator.

Co-teaching in General Classes: Disadvantages - Advantages

The implementation of co- teaching is considered to be successful and offers high-quality services to pupils when they can receive immediate educational and social benefits (Sileo & Garderen, 2010). On the other hand, the full attendance of children with special educational needs in the general classes is not uninterrupted and without difficulties. These relate to issues relating to the development of the academic and socio-emotional skills of the child.

Academic Skills

The research has identified several reasons why students with disabilities encounter difficulties in general education, such as: a) understanding the content of texts in textbooks is difficult for children due to reduced reading ability (eg Cawley & Parmar , 2001; Horton, Lovitt, & Bergerud, 1990) b) most formal cognitive activities are difficult to understand by students with disabilities (eg Ormsbee & Finson, 2000) terminology in school textbooks also hampers students with disability (e.g., King-Sears, Mercer,

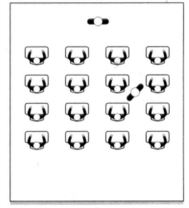
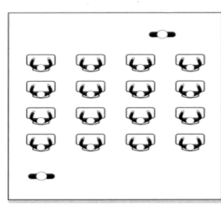
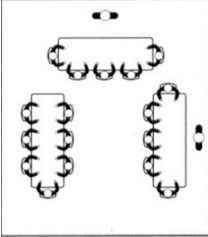
& Sindelar, 1992 · Scruggs & Mastropieri, 1993). But the physical presence of two teachers in the same classroom results in reducing the proportion of students per teacher. Students have the opportunity for better support, and there is the possibility of making the necessary changes to the classroom and the subject matter to help students understand new knowledge.

Socio-emotional skills

In a study by Koster, Pijl, Nakken and Van Houten (2010), it is stated that placing a disability pupil in general education does not automatically ensure its social participation in the environment. The child may have difficulty with limited friendships and lack of acceptance by his classmates. However, children with disabilities who study in their general classes are given the opportunity to interact with their peers without disabilities, to collaborate and share during their learning experiences. They also offer various opportunities for social integration through activities and events. Finally, according to a study by Dahlberg and Hoover (2003), a coaching class enables a student who may have a personal conflict with an educator to seek emotional or academic support from the other teacher.

Types of co-teaching model

There are several types of interactions design to maximize the effectiveness of co-teaching (Croteau, 2000; Friend, & Bursuck, 2009; Friend & Cook, 2012, 2013):

Types / Arrangements in the classroom	Description
<p>One teach – one assist</p> 	<p>One teacher, usually GED assumes responsibility for instruction; the other assists students</p>
<p>One Teach, One Observe</p> 	<p>One instructs, one observes & collects data.</p>
<p>Station Teaching</p> 	<p>Students in small groups rotate around from the stations</p>

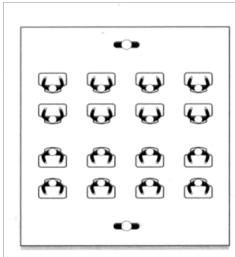
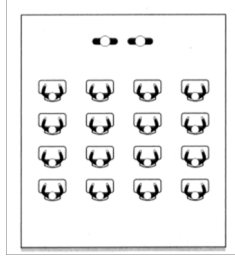
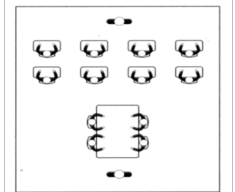
<p>Parallel Teaching</p> 	<p>The class has two heterogeneous groups (diversity in both groups receiving the same instruction).</p>
<p>Teaming</p> 	<p>Teachers share responsibilities equally. They co-plan and share instruction</p>
<p>Alternative teaching</p> 	<p>One teacher leads the larger group while another teacher provides additional or separate instruction to a small group of students</p>

Figure 1. Types of Co-teaching Model

Parallel Support: The Greek Co-Teaching Model

Over the last decade, a large number of pupils with special educational needs attend general schools (Special Education Directorate, 2007). This is related to the adoption of the last two laws 2817/2000 and 3699/2008 on special education.

Also for the school year 2018 - 2019, 5913 special education teachers and 1,592 nurses and special auxiliaries were hired for the parallel support program (Ministry of Education, November 2018)

In particular, the recent and applicable law on Special Needs Education (SNE) (3699/2008 - Government Gazette 199 / A, article 6) enables children with special educational needs to attend general school classes, taking supportive services from special education and training teachers, which are related to the type and severity of children's diagnosis. This way of providing educational services for children with disabilities is a type of co-teaching model, called "Parallel Support" in Greece.

Parallel support (PS) involves children with special educational needs when it is considered the most appropriate placement for them based on the Center for Diagnosis, Differential Diagnosis, and Support (KEDDY) report. They also participate

in the PS. pupils, when there is no other special education school), such as “special school” , “special class”, etc. in the area where the child’s family lives. In any case, in order for a student to participate in a parallel support program, he / she must have a written notice of approval from the relevant KEDDY, which specifies the times of parallel support the child will receive. If the child attends a part of integration, then the KEDDY should justify the reasons for not proposing the child’s attendance to the integration section but its participation in the parallel support. Parents’ application for the provision of parallel support to their child, together with the relevant report by the KEDDY, is submitted to the school head, which is communicated to the Ministry of Education through the Education Directorates (Law 3699/2008). In case of children with autism, a family requirement and with the approval of the Teachers’ Association, may be a special assistant in the classroom.

School year	Special educ. population (Eurydice)	Number of Students in PS settings	PS settings as % of special educ. population	Growth trends (% yearly difference)
2003 – 04	18,585	5	0.03	
2004 – 05	19,146	113	0.59	0.56
2005 – 06	22,249	207	0.93	0.54
2006 – 07	22,813	330	1.45	0.52
2007 – 08	23,470	402	1.71	0.26
2008 – 09	23,599	253	1.07	-0.64
2009 – 10	29,954	578	1.93	0.86
2010 – 11	32,861	1,054	3.21	1.28
2011 – 12	36,011	1,634	4.54	1.33
2012 – 13	35,412	2,322	6,56	2,02
2013 – 14	-	3,276	-	-
2014 – 15	-	4,564	-	-

Source. Mavropalias & Anastasiou, 2016, p. 226

Special Education Teachers in Parallel Support Certification Requirements: (a) They hold postgraduate degrees in special education or have a bachelor’s degree in special education (b) 4-year degree in special education (c) 400 hours of training in special education. (d) They are general education teachers who have 10 months of training in special education structures. (e) As far as the education of children with hearing impairments is concerned, the candidate teachers should have a specialization in the Greek Sign Language. Respectively, children with visual impairments must have Braille specialization.

Implementation of the Model of Parallel Support

In Greece, in the program of parallel support - as defined by law 2018/2000 - only children with specific educational needs are involved, while in other countries there are also children with low school performance. Additionally, the parallel support program extends to high school, while other countries may also attend students attending high school. Parallel support as implemented in Greece does not correspond to any of the six types of co-teaching, as recorded in the international literature. It seems to be closer to the type of co-teaching “ One Teach-One Assist” (Friend & Bursuck, 2009; Friend & Cook, 2012). In most cases, the general education teacher had a leading and leading role in the classroom and was responsible for teaching the content. The Special Education Teacher was the assistant who supports a disabled child and rarely two, always in the general classroom. In parallel support the special education teacher is responsible for one or two disabled children does not support the other students. Also, the role of Special Education Teacher seems to be more static, focusing on the child with special educational needs. In contrast, the type of co-taught “ One Teach-One Assist “, the Special Education Teacher wandering in the classroom to help students who need further assistance or to answer questions related to the lesson (Mavropalias & Anastasiou, 2016).

Assigning roles to teachers in the context of parallel support indicates a complex social and organizational relationship that is relatively new to most of them. It is important for teachers to understand their role in providing educational services, according to the particular needs of the pupils they support. First of all, teachers generally perceive the parallel teaching as providing assistance and support to pupils with special educational needs within the general class of educational special education. Similar definitions have been given by researchers (eg Scruggs, Mastropieri, & McDuffie, 2007). is the provision of educational services in inclusive classes by teachers working together and aimed at children with special educational needs.

From research data (Kidas, 2017; Pavlou, 2016; Mavropalias & Anastasiou, 2016), it appears that parallel support has a positive impact on children participating in it. In particular, parallel support helps to develop the cognitive, social and emotional and individual skills of children with disabilities. Similarly, from research data from international surveys, co-teachers is associated with increased cognitive performance, with improved social skills, additional classroom assistance, and benefits in the psycho-emotional area of the supported child (eg Austin, 2001; Pugach & Wesson, 1995 · Walther-Thomas, 1997.).

As far as cooperation between teachers is concerned, the level of cooperation for most teachers is unsatisfactory. The co-design of teaching was focused on one or two children

with special educational needs rather than a larger group of students. Also in co-teaching the co-teachers were “cut off” among themselves. The general education teacher was primarily responsible for the teaching of content on the basis of the curriculum, and the special education teacher supported the disabled child. But all this is inconsistent with the characteristics that successful co-teaching should have, according to international literature.

The conversation often focuses on interpersonal communication issues and on the compatibility of teachers involved in the coaching program. The Mostert (1998,) emphasizes that co-teachers should have a problem-solving orientation showing mutual respect, exemplary communication skills and open information exchange. The creation of a positive atmosphere, the willingness to constructively resolve conflicts and good interpersonal relationships, favor a positive cooperative environment. Problems in co-operating with co-teachers may also be due to their communication with the school administration and club staff working. For example, when communication with the school principal is exhausted only in service matters or when due to the traditional organization of the school there is no critical dialogue, cooperative mood, exchange of pedagogical experiences, etc., then co-teachers can also have a negative impact on the creation of the co-operation environment between them during the implementation of the PS.

From research data (Kidas, 2017; Pavlou, 2016), co-teachers want a satisfactory communication framework with the administrators of the PS program. such as KEDDY and school counselors. Teachers want to be able to communicate with them so they can feel confident about the educational work they perform, can cope with a difficult event, etc. Considering that the majority of teachers participating in Parallel Support have little experience in parallel support and limited training, it is imperative to create a framework for communication with bodies and individuals more skilled and experienced than them.

The importance of educating teachers to implement integration practices is increasingly recognized. Directions and practices for success require a systemic approach that will result from the cooperation of all actors and the adoption of a common policy among them (Dyson, 2005). One of the parameters that will probably lead to better performance of students with disabilities is to improve the education and training of teachers. This enables them to respond to the diversity and the endeavor of integrating children with special educational needs into general education (OECD, 2005).

The majority of teachers report that deficiencies in resources, resources and infrastructures negatively affect the quality of the educational work produced by parallel support. The availability of resources and appropriate teaching tools are of paramount

importance for the success of co-teaching. In other international surveys, one of the components contributing to effective co-teaching is also the support of co-teachers with the appropriate educational tools and materials (eg Bixler, 1998; Dieker, 2001). In Greece, the building infrastructure of general schools has many deficiencies. These deficiencies relate to the size of the teaching spaces, accessibility of the school premises, the configuration of the toilets to serve children with disabilities and so on. According to data from the Center for Educational Research - CER (2013) shows that only one out of seven schools in Greece meet the standards so that students with special educational needs have access to it. These deficiencies in schools make it difficult for research teachers, particularly children with mobility impairments and vision problems involved in parallel support. The lack of sufficient teaching space to allow general and special education teachers to cooperate, as well as pupils with and without special educational needs, inhibit the work of teachers. Children are also negatively affected, since noise is easily generated, distractions are favored, and so on. Similarly, Keefe and Moore (2004) report that small classrooms make it difficult for special education teachers to make the necessary spatial interventions aimed at more effective co-teaching.

Conclusion

Parallel Support is an important institution for the Greek educational system, it helps socially and schoolly integrate children with special educational needs, has a positive impact on the child's emotional field and at the same time offers significant help to the families of children with special educational needs participating in PC program

Teachers believe that parallel support is needed at school, it is an effective program for children with special educational needs and gives them the possibility of equal opportunities. Other international researchers, such as Murawski and Hughes (2009), who consider that pupils with special educational needs in a co-teaching setting benefit from behavior, social skills and self-esteem in relation to the importance of co-teaching with children taught in self-contained structures of special education. Similarly, Keefe and Moore (2004) emphasize the importance of co-teaching because students with special educational needs are less likely to be stigmatized due to their disability than they were in separate special education units. Parallel support enables students with disabilities to interact, share and collaborate during their learning experiences. They also offer a variety of opportunities for social inclusion through activities and events in the field of general education.

Theoharis (2007) reports that attending pupils in general classes is also a matter of social justice, since it enables children with disabilities - who have been excluded from general education - to co-exist and attend curricula with their peers. In addition, many parents of children with special educational needs consider co-teaching to be of great

importance since they believe that their children benefit greatly when most of their education is in the context of general education coexisting with other children without special educational needs (Cardona, 2009).

Parallel support is beneficial for children with and without special educational needs. Karagiannis Stainback and Stainback (1996) report that from inclusive education students with disabilities learn to respect the individual's right to the dispute. At the same time, the opportunities for building social relations between students coexisting in the same general class are also given. Also, from the interaction of children with each other, typical peers often support and help children with special educational needs, thus developing the feeling of social sensitivity.

Suggestions

Parallel support was recognized by research educators as a viable type of co-teaching for the education of children with disabilities in the least restrictive environment. Many schools implement cooperative programs, enabling students with special educational needs to be trained in general classes. The parallel support program is implemented in a number of schools, which are a fraction of the total number of schools in Greece. Taking into account that only primary schools are about 12,000 (Greek Ministry of Education, 2012) and in almost every school there is a pupil who needs support in a Bachelor's degree, then it is necessary to extend the program. Also, not to stop at middle school, but to continue at high school.

A key issue for a better implementation of the PS model. is to ensure the equivalence of teachers. As a first step, the special education teacher could be defined in one class rather than individual pupils. Also, teachers who implement parallel support have a lack of specific knowledge and skills related to special education issues and with parallel support. The state must, with flexible and modern forms of training, be able to train both introductions and during the PS program. special and general education teachers in order to be effective in the tasks entrusted to them. In addition, curricula that address inclusion and inclusion issues should be re-examined at undergraduate level so that future teachers are prepared to teach in a collaborative environment. In a training program that aims, among other things, in the integration of pupils with disabilities, not only is the will to offer services to its students. Improving infrastructure and enhancing schools where parallel support for materials, resources and resources is being implemented is seen as imperative. Enhancement in materials and media should be accurately related to the diagnosis of the child being supported.

As for the roles of co-teachers who implement parallel support, it has emerged that in many cases teachers do not equally share their roles and responsibilities. The role of special education teacher is complementary to that of colleague of general

education teacher. In co-teaching, the role of each teacher should be distinct and equal. Collaboration among co-teachers is recognized as a key component of co-teaching. In the literature, co-teaching is considered successful when it involves (a) co-design, (b) co-teaching, (c) co-evaluation, and (c) classroom management. -Training and needs training for co-workers in collaborative practices.

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A Comprehensive Review of Various Teaching Methods: A Guide for Young Teachers

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Introduction

Teaching and learning always go together, once a learning student will become teacher and the cycle rotates. The teacher effectiveness in sharing the knowledge to students depends on how well he/she organizes their teaching. The students in a class room are not the same in absorbing knowledge; each one has the different styles of learning process, which makes the teachers work more difficult. So one type of teaching will not serve the purpose in the class room and they have to choose various other methods to make students attentive in the class. The traditional method of teaching by lecturers has many disadvantages than advantages in learning process. But they are still effective in certain curricular contents.

The teacher must help the students to learn, to inculcate problem solving skills, understand the effectiveness of hard work and dedication, motivation to learn and meet their expectations, helping their friends to build team spirit and learn how to take decisions in real life problems.

The studies have shown that traditional method of teaching will not be able to bring out the expected qualities in students and learning must be situated in the context of meaningful activity for knowledge to be used in similar situations later in their life (Driscoll, 1994; Bandura, 1997; Marzano, 2007). It should be noted that learners must be actively engaged in the processing of information and that the teaching and learning process involves an interaction among the teacher, the students, and the content (Marzano, 2007).

The teacher must put effort to bring out content based curriculum which maximizes the learning process rather than pouring all contents on them. The relevant learning objective should be selected for assessment which is essential for their future life.

Apart from this more important is delivery of content to students which they should grasp and apply as they learn. So teachers have to ponder the new ways of teaching which makes students to be more attentive and proper learning process takes place during the class.

Today's generation is more inclined towards technology and it becomes imperative for faculty to adopt new methods of teaching involving technology. In addition to understanding student's requirement, teachers have to figure out what learning is. To

know this, they need to comprehend a learning theory.

A learning theory comprises a set of constructs linking observed changes in performance with what is thought to bring about those changes. According to Driscoll (1994), learning theory has three basic elements: 1) Inputs (Motivation and efficacy) 2) Means (Teaching methods, Facilitation, supporting) 3) Outcome (Learning and skills developed).

So one of major component in learning theory is, teaching method which brings fundamental changes in learner and facilitates the process of knowledge transmission.

The teaching process has mainly THREE types:

1. Teacher centered methods: Under this method, students simply obtain information from the teacher without building their engagement level with the subject being taught (Boud & Feletti 1999).
2. Student centered methods; Most teachers today apply the student-centered approach to promote interest, analytical research, critical thinking and enjoyment among students (Hesson & Shad 2007).
3. Teacher and student interactive methods: The method encourages the students to search for relevant knowledge rather than the lecturer monopolizing the transmission of information to the learners. As such, research evidence on teaching approaches maintains that this teaching method is effective in improving students' academic performance (Damodharan & Rengarajan ,1999)

So in this review we are analyzing various teaching methods which can be implemented during teaching process and teachers should apply appropriate teaching methods that best suit their students.

Brief Overview about Learning Styles

The term, 'learning style' describes an individual's preferred method of gathering, processing, interpreting, organizing and analyzing the information. Different people use various learning styles in order to acquire knowledge, skills and attitudes. Learning style is one of the way in which students begin to focus on the topic, understand and apply new information in real life situations irrespective of their fields.

Each person has a particular set of learning abilities. Educational research shows that "one size does not fit all" (Reigeluth , 1996). In this context, it is of utmost importance that the teachers understand the learning styles of their students and implement proper teaching techniques to have gainful knowledge sharing process with students.

The various studies also concluded that learning styles vary from each student and has

direct impact on outcome.

- A study has shown that learning styles are regarded as one of the crucial factors to be taken into account when designing instruction and learning environments (Felder & Brent, 2005).
- The study done by Felder & Henriques, showed that some students prefer to learn by themselves in their own time, in familiar surroundings rather than in groups. Students tend to perceive information differently, such as by viewing and listening, reflective and acting, to reasoning logically and intuitively and also scrutinizing and visualizing” (Felder & Henriques, 1995).
- Another study showed that the learning styles of the students influence their ability to acquire information and respond to the learning environment (Azlinda, 2006) and in addition, students study differently; “what works well for one student may not be beneficial or favourable to another” (Man & Tomoko, 2010).
- The studies also showed that when teaching methods and students learning styles are mismatched lead various adverse effects in learning process which include, less attention in the classroom, students performance got affected, they get disheartened about the course, the curriculum and ultimately leading to drop out from school” (Felder & Spurlin, 2005).

Therefore, teachers should not disregard the importance of choosing the appropriate teaching method to suit students’ learning styles, as both teaching and learning styles play a crucial role in learning process and achievement.

Traditional teaching method

Lecturers:

Lectures are conducted by teachers and involve mostly one way teaching. Here teacher acts as resource person and students will receive the information. The teacher uses various delivery mediums such as black board and chalk, white board and marker, Overhead projectors (OHP) and power point presentations. In this method the studies have shown that learning mode tends to be passive and the learners play little part in their learning process (Orlich, D. C., Harder, R. J., Callahan, R.C., and Gibson, H.W., 1998). It has been found that the conventional lecture approach in classroom is of limited effectiveness in both teaching and learning process.

Some of advantages are:

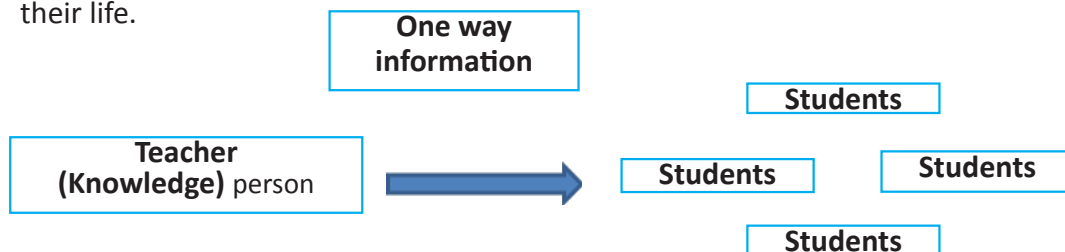
- It is needed for larger class strength.

- Teacher will act as experienced resource person and students can have certain amount of interaction.
- Teacher will explain all points so that students can understand all components of subjects.
- Teacher finishes the topic in stipulated time.
- Teacher can ask questions to students.
- Teacher will be role model to students.
- Teacher keeps the classroom in order
- Teacher makes sure that all students complete the given activity in the session.

All these points are possible only when students involve themselves in understanding the subject.

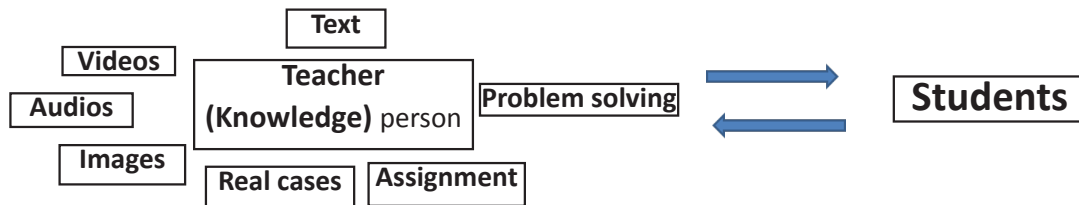
The major disadvantages are as follows:

- Teaching mostly one way as all the information from teacher move towards students.
- Teaching will be monotonous without knowing students response and feedback.
- The material presented is only based on lecturer notes and textbooks.
- Teaching will not have real case interactions.
- The legitimacy of teachers writing on board will have direct impact on their learning outcome.
- Interaction among students will be NIL
- Self-learning to become life-long learners will be absent.
- Students read only for examinations rather than obtaining knowledge to apply in their life.



Teaching using recent techniques:

Even the traditional teaching lecture methods can be made as interactive sessions using various multimedia resources. The main aim is to keep student alert in the class so that learning can take place. The use of multimedia may in the form of text, videos, audios, images, clip art, flow charts, real case scenarios, problem solving techniques etc. This will have impact on student's creativity, interaction among groups, developing problem solving, communication and analytical skills.



Active learning:

Is a process where student actively involved in learning process in short, active learning requires students to do meaningful learning activities and think about what they are doing (Bonwell & Eison, 1991).

Bonwell and Eison recognized a range of activities that will fall within it. They suggest a spectrum of activities to promote active learning, ranging from very simple (e.g., pausing lecture to allow students to clarify and organize their ideas by discussing with classmates) to more complex (e.g., using case studies as a focal point for decision-making).

Collaborative learning (CL) According to Online Collaborative Learning in Higher Education it is defined as any instructional method in which students work together in small groups toward a common goal. As such, collaborative learning can be viewed as encompassing all group-based instructional methods, including cooperative learning (Millis, 1998 ; Smith, 1992 ; Cusea,1992 ; Bean ,1996 ; Felder, 2002).

In this educational approach of teaching and learning involves groups of learners working together to solve a problem, complete a task, or bring a consensus outcome. In the CL environment, the learners are challenged both socially and emotionally as they listen to different perspectives, and are required to articulate and defend their ideas. In so doing,

the learners begin to create their own unique conceptual frameworks and not rely solely on an expert's or a text's framework. In a CL setting, learners have the opportunity to converse with peers, present and defend ideas, exchange diverse beliefs, question other conceptual frameworks, and are actively engaged (Srinivas , 2001).

Advantages:

1. Along with teaching session allows students group discussion.
2. Allows students to do active work on the content by discussing among themselves.
3. Students tend to help each other in completing the task may be in the form of case/ short assignment, multiple choice questions, short answers etc.
4. Small group discussions help them to retain the information (Johnson, & Johnson, 1986).
5. Provides platform for discussions with peers and teacher.
6. Promotes critical thinking among students (Gokhale, 1995).

Cooperative learning can be defined as a structured form of group work where students pursue common goals while being assessed individually. (Millis, 1998 ; Bruffee, 1995) The most common model of cooperative learning found in the engineering literature is that of Johnson, Johnson and Smith (Panitz ,2003) This model incorporates five specific principles, which are individual accountability, mutual interdependence, face-to-face promotive interaction, appropriate practice of interpersonal skills, and regular self-assessment of team functioning. While different cooperative learning models exist (Feden ,2003 ; Johnson ,1998) the core element held in common is a focus on cooperative incentives rather than competition to promote learning.

The students work in group to complete the task given by the faculty in a particular session. But mere formation of group does not makes students to learn, the teacher has to make students together by giving an opportunity in the task which promotes mutual cooperation. For the same reason teacher has to find a task which benefits them rather than giving an work for completion.

Johnson and Johnson (2009) proposed 5 key points for successful Cooperative learning, they are

1. Structuring positive interdependence.
2. Promote interaction or the willingness of group members to encourage and facilitate each other's efforts.
3. Individual accountability or one's responsibility in their work.
4. Developing interpersonal skills.
5. Group processing: Involves students reflecting on their progress and their working relationships.

Problem-based learning (PBL) is an instructional method where relevant problems are introduced at the beginning of the instruction cycle and used to provide the context and motivation for the learning that follows. The student will go through the objectives and search for answers in various books. PBL typically involves significant amounts of self-directed learning on the part of the students (Michael , 2004). The student shares the knowledge gained with their group and thereby achieving their learning outcomes in meaningful way.

Thumb rule for successful PBL are:

- Identify the proper problem that encourages students to have interaction.
- Faculty should be facilitator and allow students to have discussion
- Allow the students to come up with their objectives.
- Every student should know the relevance of objectives.
- All the students should read the resources for presentations.
- Teacher should be impartial during presentation sessions.
- Give constructive teacher and peer feedback.

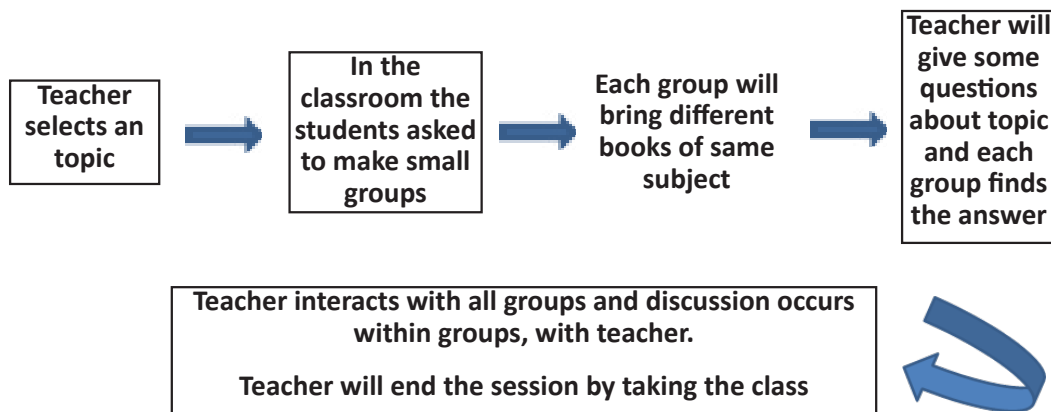
Team Based Learning (TBL): Parmelee and colleagues defined team-based learning (TBL) as “an active learning and small group instructional strategy that provides students with opportunities to apply conceptual knowledge through a sequence of activities that includes individual work, team work, and immediate feedback.” (Parmelee & Michaelsen,2012)

Team-based learning (TBL) possibly relies on small group interaction more heavily than any other commonly used instructional strategy in postsecondary education. Team Based Learning is a structured form of small-group learning that emphasizes student preparation out of classroom and application of knowledge in the classroom. Students are organized strategically into diverse teams of 5-7 students that work together throughout the class and can be used for large class strength also (Brame ,2016).

Team-based learning is a form of cooperative learning that creates an environment that allows learners to develop higher levels of learning (ie, application, analysis, evaluation, creativity).

Book talk: In this the students are given common task on particular topics having small groups. But each group will use different books of same topic to find the answers. Later they will have discussion among them about the questions posed by the faculty.

The advantage of this is students will have information of different books in common session.



Advantages:

- Students will learn all content information in different books in one session.
- Students will interact with each other groups.
- Teacher will solve any contradictory statements regarding the questions posed to them.
- Students will learn how to find the resource from library.
- Teach will have brief session at the end.

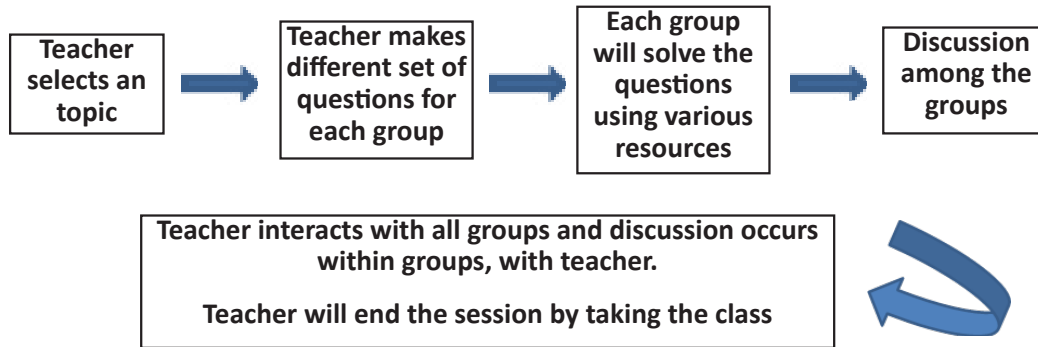
Group discussion:

One of the ways to make all students attentive in the class is to have group discussion. The students are divided into groups of 7-8 and asked to have discussion among the topic. The teachers will facilitate the discussion among students by giving those questions pertaining to the topic. Each group can receive different set of questions and will get the answers using the various resources. After the certain time period all the groups will have discussion among other groups.

The main advantages of this method are that:

- Students will work together and discuss among them self's.
- Attendance will be increased as learning taking place and student feel that they are gaining the knowledge.
- They can have discussion among themselves, across the groups and with teacher to clarify any points.

- Self-learning promoted
- Students learn to respect other point of views.
- Students can also make small presentation and present in front of all students so that learning process will be effective.

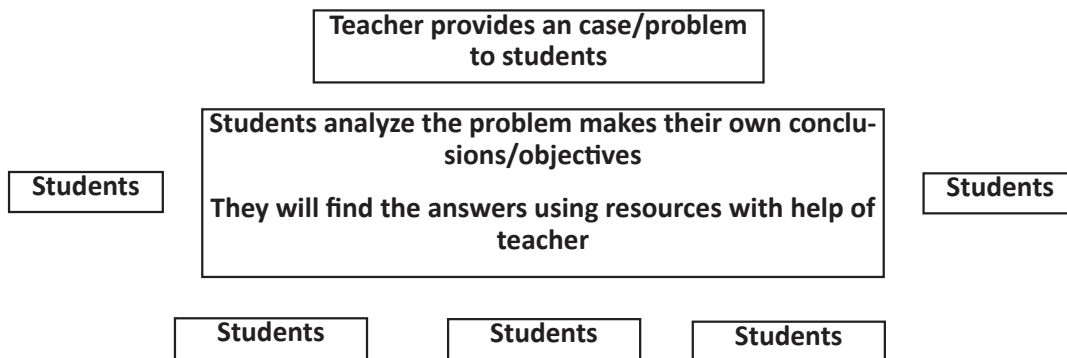


Seminar presentation:

A small topic is selected by the faculty and each student will have small topics to present as seminar. The student will take help of faculty to prepare the notes/presentations. The student can add their creative ideas in presentation to make the topic to be understood by other students. This method has advantage that students will go through the topic and makes an effort to understand the topics. Self-learning will be boosted and increases the self confidence in children’s. Most importantly the student will use the library for resource finding.

Brain storming sessions:

This method the faculty will put forward a case/problem/real case scenario to students. The students are allowed to brain storm among themselves to have proper objectives for learning process. The students will interact with each other in responding to the problem and they will find the answers. In this process the students will participate effectively and learning takes place to gain knowledge.



Textbook assignments:

The faculty will assign a topic with certain objectives to all students in the class. The students will be encouraged to read different books and involve their creatively in writing the assignment work with clear understanding of topic. Sometimes teacher can assess their learning process by having viva with individual students. If the topic requires a session the teacher can have interactive class with students as all students were sensitized with the topic.

Flipped room method:

Flipped classroom is an active, student-centered approach that was formed to increase the quality of learning process within class. Flipped classroom approach active learning session (Tucker, 2012), is a special type of blended learning (Strayer, 2012). It mainly provides preparation time for students about the topic before the course or (Bristol, 2014) and during course applying activities that increase the quality of face to face education (Formica, 2010).

Many researchers have defined flipped classroom in various ways, according to Bishop and Verleger (2013) flipped classroom is a student-centered learning method consisting of two parts with interactive learning activities during lesson and individual teaching bases directly on computer out of lesson.

Mull (2012) defined it as a model that provides students prepare themselves for the lesson by watching videos, listening podcasts and reading articles.

In this approach before the course the students watch theoretical part of lesson via multiple equipment's such as online videos, presentations, learning management systems and take notes, prepare questions about the parts that they do not understand (Kim, 2014). During course they achieve supporting activities such as finding answers together to the questions they prepared before lesson, group working, problem solving, discussion and making an inference (35). Flipped classroom is an approach makes students and teacher responsible for learning process.

Conclusion

The learning styles of students vary from each other and the teacher has to use various teaching methods for proper transfer of knowledge to students. The main goal of teaching methods is to make student attentive, able to show interest in the topic, grasp the knowledge in the classroom, make them self-leaners with little assistance and thereby make them lifelong learners.

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Teaching through Research: Proposal of a Didactic Device for High School

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Introduction

One of the main problems that mathematics education faces is the general reluctance citizens feel. In particular, this is due to the fact that school has forced generations of students to visit mathematical notions that lack reason to be (Chevallard, 2017). In the last Anthropological Theory of the Didactic (Chevallard, 2013a, 2013b, 2017) a new paradigm for the study of mathematics is advocated. This is known as world questions paradigm, which is based on the principle that education is a life-long process and the approach to knowledge is intrinsically motivated by the study need. It is a functional study justified by the problem to be solved. The community studies a question where the inquiry is deepened, leading students to find or re-find works to build an appropriate answer.

In this work, a didactic device for high school is proposed. The goal is to discuss, explore, conjecture, ask, create new problems and promote a genuine mathematic activity. The proposal adopts an epistemological conception that considers mathematics as a functional and useful knowledge. The didactic device starts with a question that demands to compare the cell companies' plans. It implies to analyze an everyday situation any citizen may experience, where neither the data nor the variables are fully determined beforehand. The situation is inspired in the proposal of Rodríguez, Hidalgo, Sierra (2013), who suggests comparing and analyzing situations close to reality. However, my proposal requires students to compare the fees of cell telephony analyzing the current state of companies in Argentine.

In relationship with the epistemological conception of the Anthropological Theory of the Didactical (ATD), this situation generates a mathematical activity which is a bit unusual in the current teaching system. This activity consists in formulating and answering questions, searching in different media, developing different techniques, making conjectures, validating solutions, interacting with other members of the group while comparing results, techniques, validations, etc. In this proposal it is fundamental to break with the atomised conception of the mathematics and to go over different mathematical organizations according to study needs.

The role of the traditional teacher needs to change. He has to move from the habitual place accepted in the institution, and abandon the function of protagonist to give way to the students doing. The teacher has to be the director of the study and research

process, able to influence opportunely and effectively to foster the study. The teacher's study help must enable the students to find where the problematic of the situation is as well as to keep the study meaningful.

Framework

The Anthropological Theory of the Didactic (Chevallard, 1999, 2007, 2013a, 2013b, 2017) proposes to introduce functional study processes in the teaching system. It aims to analyze fundamental questions (in general non-mathematics), which give rise to the curriculum. The study of these questions generates new questions to study, and reveals the necessary work to use. In this paradigm, the leadership of the questions takes precedence (and the corresponding answers to them) attenuating the leadership of the work that traditional pedagogy allocates. This proposal is materialised in a didactic device named Study and Research Paths (SRP). This device supports a new scholar epistemology based on the research and the world question. The methodology of the new paradigm needs to add didactic gestures, which involve changes with respect to traditional teaching. This proposal would permit to confront the didactic phenomena identified by Chevallard (2013a) as monumentalisation of the knowledge, typical of the visit work paradigm. Here, the study is found directly and its study is motivated by a formal decision according to traditional lineal organisation.

A typical didactic system of the research paradigm is characterized by a student group X that study a questions Q with the help of a teacher or teacher group Y , who together contribute a possible answer to . The production of requires that the didactic system S has instruments, resources, works. That is, the system needs to generate a didactic medium M to produce .

The SRP begins with a question suggested by the teacher. The study leads to find or re-find several mathematical organisations and other disciplines. In this way, it follows that the question-answer pairs are the core of the study processes . Here are all the questions in the core ♥ and are the corresponding answers for each (Chevallard, 2007).

The didactic gestures typical of the study and research named dialectics are required to implement a SRP (Chevallard, 2007, 2013b). Next, five essential dialectics can emerge from processing the situation study suggested in this paper:

- *The study and research dialectic.* A research supposes the study of the combination of questions and pre-established answers. This dialectic is the engine of teaching for SRP. We cannot research without studying. In addition, a genuine study is the generator of questions to be researched.
- *The media and middle dialectic.* The productions of provisional successive answers

require pre-established answers, accessible by means of communication and diffusion: the media (book, paper, class note, etc.). These answers are the product of conjecture, therefore they must be checked before being transformed and incorporated to the medium.

- *The individual and group dialectic.* The students with the study director must distribute the task and negotiate the responsibility.
- *The dialectic of getting in and out of topic.* If the question is open and brainstorming, it is likeable to get out of the topic, even it could be necessary to get out of the reference discipline and get back in later.
- *The dialectic dark boxes and the light boxes.* This refers to the need to establish whether a work deserves to be studied, clarified analyzed, etc., or some knowledge is approached at grey level. Here is not essential to answer the brainstorming questions and its derivate questions.

A teaching by SRP presupposes the formulation of questions and its study in agreement with the full group. This demands to share out responsibility and allocate individual task. Thus, the group process of producing answers is resumed. The works found or re-found to produce the answers will be studied with certain level of depth to establish its pertinence. Moreover, during the study new questions can appear, which the study community will decide when and how to answer. Therefore, the responsibility of the study does not fall in the individual but rather in the producing community which holds and validates the answers generated collectively.

Next, the description of a situation is suggested. Its study allows that some typical gestures of the pedagogy of research emerge.

Description of the didactic proposal

This didactic device starts in situation 1. The analysis of the situation generates questions not planned from the start. Here a possible path is proposed. The activity can be developed in several directions. Studying the questions with more or less depth will depend on the students' general interest.

The teacher's activity consists in supervising the productions of the students and regulating the time to systematize the discussion of the different groups. It is fundamental that the students keep the initial situation meaningful. They should avoid giving immediate answers because they impede to problematize and find the functionality of mathematics to provide an answer.

First, the initial situation is presented:

Situation 1

There are several Cell Companies in the market. We want to contract one. Which one? Why?

Next, possible paths that can emerge during the study are described. In addition, situations are proposed to develop the study as a result of either the students' proposal or the teacher's formulation.

In this way, it is essential that learners group come up with the need to play formulating questions and answers which do not provide an immediate answer.

As a first step, the teacher can ask the learners: "What cell companies do you use?" "Why did you choose these cell companies?" The students are expected to formulate new questions focused on the analysis of the plans of the cell telephony. This information is available on the web pages of each cell company but, as it is varied, students need to organize it to compare and decide how to study it.

Currently, three companies in Argentina offer the following information about their plans:

- Fee plan charge
- Megas available to use internet.
- Telephone number to talk unlimitedly.
- Available credit to all consumption.
- SMS included in the plan
- Purchase cost to use internet once the available credit is over.
- Form and cost of local and long distance calls.
- Form and cost of local and long distance calls once the available credit is over.
- Access to music and video.
- Available minutes to talk included in the fee plan charge.

Analyzing the fee plan charge we can understand how the cell companies value the communication by telephonic call. The resolution N° 26/2013 of the Ministry of federal planning, public investment and services in Argentina, establishes that the first 30 seconds of the communication have a fixed cost, then the cost is valued per second.

Next, the situation 1 is developed. This leads to go through different mathematics praxeologies, some of which form part of the curricula of the high school in Argentina.

The exploration of situation 1 generates new questions. Firstly, if we want to contract one cell company, we have to establish our needs. Therefore, we must study the following questions:

Situation 2

How do we use our cell?

For each client, this information is available in cell telephone or in personal profile of the web page company.

To establish what we use our cell for, we need to collect and synthesize information about contact number, register call, SMS use, etc. Thus, the student will be able to study fundamental tasks about descriptive statistics, such as: collect data, organize data in tables, analyze values of categorical variables and numerical variables, summarize and represent data, communicate information from statistical studies. This task leads, for example, to establish temporal space to register the data and organize them in tables. In this organization basic notions of statistics such as relative and absolute frequency may participate.

The study depends on the personal use that each student makes of his cell phone. For example, the proliferation of the use of WhatsApp to establish communication via message generates that SMS turn out obsolete or only employed by the company of cell telephony for publicity. If the study does not progress and the questions formulated do not suggest further depth, I propose the study of the next situation.

Situation 3

What other forms of communication can we establish with the cell?

In relation to the study of situation 3, it is possible to increase the information about the cell phone use beyond the personal scope. To start this analysis, the information should result useful to make a survey. This is proposed in situation 4:

Situation 4

Make a survey to gather information about how secondary students use their cell phones.

These situations lead us to the problematic: How is a survey prepared? How do we implement the survey? How is the generated data analyzed? How are the results reported? Again, the study of data from descriptive statistic is vital. The analysis also involves the use of some software to summarize data volume.

If we go back to the initial situation, we can also study the following:

Situation 5

What data are considered to compare the fee of cell telephony?

To compare the fee of cell telephony, it is necessary to consider the aspects indicated in the description of the situation 1.

The megas to use internet can be quantified from different applicative to cell telephone. This is complex to analyze because it depends on the applicative chosen by the user. For the final analysis the megas offered by each company will be considered in relation with the plan cost.

The access to music and video depends on each company. Some companies offer this package at zero cost for a limited period.

The communication by SMS is simple to analyze. The SMS cost is given for unit cost. If we want to know which company offers the lowest SMS cost, we can analyze the companies' information and decide. To calculate the SMS cost we can use the following expression:

$$m(x)=kx$$

The expression $m(x)$ belongs to a direct proportionality function. Here, x represents the message number and k the unit cost of the message.

In an ideal case, all available credit for all consumption (c_r) included in the payment is used to send SMS. In this case, $[c_r/k]$ SMS can be sent as maximum. In this expression, we used entire part function because if the quotient does not turn out to be a natural number, the resultant decimal of the operation is not sufficient to cover the send cost of a message.

Finally, the domain function $m(x)$ is:

$$dom(m(x)) = \left\{x \in \mathbb{N} / 1 \leq x \leq \left[\frac{c_r}{k} \right] \right\}$$

To decide which company has less cost to send SMS is sufficient to compare the pending of $m(x)$ for each company. Also, this should be studied in relation with the available credit to all consumption of each plan. The company offers different cost to send SMS and available credit to all consumption. Sometimes, the company that offers the lowest cost to send SMS does not always offer the most available credit to all consumption. Thus, the study must be made in a comprehensive way.

The most problematic of the situation is when we want to analyze the telephonic call cost. So, we have to understand how the company rates the telephonic call. In this

regards, the following situation is propose to study.

Situation 6

How to calculate the cost of a call?

According to resolution N° 26/2013 of the Ministry of federal planning, public investment and services of the Argentine Republic, the way the call is valued by companies of cell telephone is a fixed cost to the first 30 seconds once established communication and, then the cost is valued per second.

Regarding the plans that the companies offer, the students might give immediate answer, indicating the available information on the web page of each company. This situation is not problematic as the students do not find the usefulness of maths to answer. In this situation, I propose to study the following:

Situation 7

What is the cost of all the calls registered in the personal cell telephone? How to calculate it?

Situation 8

What is more advisable: talk t seconds in one call or in several calls? Why?

Given available information in the plans that the telephone cell companies offer, it follows that to calculate the cost of a call, the companies will invoice a fixed cost that considers the first seconds of communication. Then, the companies establish a cost for each extra second that the communication goes on.

Finally, the group can obtain the next mathematical model to calculate the cost of a t seconds call.

$$c(t) = \begin{cases} c_e & \text{si } 1 \leq t \leq t_e \\ c_e + c_s(t - t_e) & \text{si } t_e + 1 \leq t \leq \left\lfloor \frac{c_r - c_e}{c_s} + t_e \right\rfloor \end{cases}$$

Where t_e is the maximum time that contemplates the cost for the establishment of the call. c_r is the credit for all consumption. c_e is the cost for establishing the call. Finally, c_s is the cost for each second after the t_e seconds once established the communication.

The expression cost $c(t)$ belongs to a function defined by pieces. This is composed by a branch that belongs to the expression of a constant function and another one that belongs to the expression lineal function. The latter is positive and increasing because $c_e > 0$ and $c_s > 0$. In addition, $c_s t_e$ is smaller than c_e , otherwise the situations would not have sense. Were $c_s t_e \geq c_e$, to some values of t , the cost of the call would be negative. Namely, it would indicate loss to the companies and balance in favour of the user. In this

way, the minimum cost of a call is c_e .

The domain of $c(t)$ is:

$$Dom(c(t)) = \left\{ t \in \mathbb{N} / 1 \leq t \leq \left\lfloor \frac{c_r - c_e}{c_s} + t_e \right\rfloor \right\}$$

t represents the time which is continuous. However, in the problem context t is considered to take natural values by the form of call valuation of the cell telephone companies.

The companies value the time a communication lasts by the roof function. For example, if a telephone communication lasts 41.6 seconds, the companies will invoice 42 seconds. However, if the time t is considered as continuum ($t \in \mathbb{R}^+$) the second function branch $c(t)$ needs transforming in $c_e + c_s([t] - t_e)$. In this paper we will consider that because the registration of the last call in the cell phone or on the personal web page is in seconds instead of split seconds.

Next, the function $c(t)$ is analyzed. The branch that involves a constant function represents the cost of a call which lasts from 1 to t_e seconds. In this term, all the calls have the same cost and are worth t_e seconds. In turn, to calls which last over t_e seconds, the cost function corresponds to a lineal function. In this case, the validity needs to be analyzed.

The telephone cell companies stipulate an available credit to all consumption (c_r) for each plan they offer. Suppose that c_r were used in a continuous call to maximize its use. If we consumed c_r in telephone communications of different duration, the cost of the call would always be affected by the cost of the communication establishment.

Thus, we may be able to maintain a communication that lasts at most $\left\lfloor \frac{c_r - c_e}{c_s} + t_e \right\rfloor$ seconds with available credit to all consumption that the companies stipulate, the maximum time to talk is the result of the following equation:

$$\begin{aligned} c_e + c_s(t - t_e) &= c_r \\ t &= \frac{c_r - c_e}{c_s} + t_e \end{aligned}$$

The floor function is used in the expression $\left\lfloor \frac{c_r - c_e}{c_s} + t_e \right\rfloor$, because according to the value to each parameter, the result of the operation can be a rational number. The split seconds that are the result of the calculus are lost by the user. The companies fix the communication per second duration.

To deepen the analysis of the comparison among cell companies is interesting to analyze current situations. The three companies hereto considered propose the following plans. This data correspond to the most economical plan of the three companies dated

October 2017 in Argentine:

Company	Plan cost	Internet included	Available credit to all consumption	SMS Included	SMS Excess	Call connection (First30 seconds)	Second included cost	Minutes free to call other companies
Company 1	\$250	1G	\$55	100	\$1,80	\$1,5780	\$0,0526	-----
Company 2	\$299	2G	\$30	Unlimited	\$ 2,67	\$2,9251	\$0,0975	200
Company 3	\$260	1G	\$30	Unlimited	-----	\$2,31	\$0,077	200

Suppose we wanted to know how long we can call with the available credit full to consumption credit offered by each company. In Company 1 the plan allows to call 1045 seconds (approximately 17 minutes). In Company 2, the plan allows to call 307 seconds (approximately 5 minutes). In Company 3 to call 389 seconds (approximately 6 minutes).

In particular, the Company 1 plan offers lower cost of both the call connection and seconds than the plan of the Companies 2 and 3. Also, the full credit consumption is higher in the plan offered by Company 1. Finally, we conclude that it is possible to have calls of similar duration for the plans offered by the Companies 2 and 3.

If we study totality plan, the companies 2 and 3 included 200 minutes to call other companies and they offer the same full credit consumptions. I conclude that it is possible to have calls of similar duration for both plans. It is only for communications nearer than 30 kilometers though, as the Company 2 applies additional cost.

The analysis of call cost can be deepened studying the functions of the particular case of each company. However, it is suggested moving away from particular situations to study possible cases we might face. In this sense, the following situation is proposed:

Situation 9

Considering two cell companies that offer different cost for call connection and the cost per second after seconds once connected, which company is more economical in relation with the duration of the call?

Suppose that cost function for two cell companies were the following.

$$c_1(t) = \begin{cases} c_{e1} & si\ 1 \leq t \leq t_e \\ c_{s1}t + c_{e1} - c_{s1}t_e & si\ t_e + 1 \leq t \leq \left\lceil \frac{c_{r1} - c_{e1}}{c_{s1}} + t_e \right\rceil \end{cases}$$

$$c_2(t) = \begin{cases} c_{e2} & si\ 1 \leq t \leq t_e \\ c_{s2}t + c_{e2} - c_{s2}t_e & si\ t_e + 1 \leq t \leq \left\lceil \frac{c_{r2} - c_{e2}}{c_{s2}} + t_e \right\rceil \end{cases}$$

In both expressions, the expression of the second branch involving a lineal function was modified by means of algebraic techniques. In particular, we aim at obtaining an

expression as $f(x)=ax+b$, thus leaning the composition of parameter b . This depends on c_e and c_s . It results that $b=c_e-c_s t_e$. b is a positive parameter because c_e, c_s, t_e are fixed cost and $c_e \geq c_s t_e$.

The study of the situation 9 analyzes to what time values t , result $c_1(t)=c_2(t)$, $c_1(t)<c_2(t)$ y $c_1(t)>c_2(t)$. To compare it is essential to interpret the involved situation. The particular cases of each company may be studied by arithmetic, graphic and algebraic techniques. Here only the algebraic techniques are used as they justified to others.

To compare the call cost of each company we need to analyze the possible values of the parameters that make up the expression (c_e and c_s) will not be analyzed here because it is a set value and identical to all companies. This allows to predict possible cases:

Case 1: If $c_{e1} = c_{e2}$ and $c_{s1} < c_{s2}$ or if $c_{e1} = c_{e2}$ and $c_{s1} > c_{s2}$

For both companies, the call connection cost is the same, but it is higher at t_e seconds in one of them.

The second branch in the cost function $c(t)$ between both companies differ in origin ordinate and slope. Therefore, a period in which the cost for both companies will be the same can be established. This depends on the value of cost per call connection (c_e), the cost of the second after seconds of the call connection, and the available credit to full consumption (c_r). After this period, the company with higher cost of the second after t_e seconds of call connection will be the most expensive company. To know the time where both companies have the same cost we propose:

$$c_{e1} + c_{s1}(t_i - t_e) = c_{e2} + c_{s2}(t_i - t_e)$$

For $t_i = \frac{c_{e2}-c_{e1}}{c_{s1}-c_{s2}} + t_e$ the cost of the communication is the same for both companies. The moment t_i equals t_e . Since $c_{e1} = c_{e2}$, emerges that $t_i = 0 + t_e$, e. i. $t_i = t_e$. For communications that last 1 a t_e seconds, the cost is the same for both companies.

Case 2: If $c_{e1} > c_{e2}$ and $c_{s1} < c_{s2}$ or if $c_{e1} < c_{e2}$ and $c_{s1} > c_{s2}$

In this case, the call connection cost (c_e) is higher in one of the companies, but it has a lower cost of second after seconds full connection (c_s).

For the first t_e seconds of the communication, the company that offers lower cost for call connection will be more economical. To study those communications that last over seconds, it is necessary to analyze the second branch of the cost function. The lineal function for each company differs in the value of origin ordinate and slope, so at some moment both functions will have the same cost $c(t)$. From this moment on, the company which was more expensive will become more economical. To know this point,

we propose:

$$c_{e1} + c_{s1}(t_i - t_e) = c_{e2} + c_{s2}(t_i - t_e)$$

For $t_i = \frac{c_{e2} - c_{e1}}{c_{s1} - c_{s2}} + t_e$. the cost of the communication for both companies is the same. Thus , $t_i > t_e$, since if the quotient sign $\frac{c_{e2} - c_{e1}}{c_{s1} - c_{s2}}$. For $c_{e1} > c_{e2}$ and $c_{s1} > c_{s2}$ or for $c_{e1} > c_{e2}$ and $c_{s1} < c_{s2}$, is always positive.

For those calls that last more than t_i , the most economical company will be the one that has the highest call connection cost.

Case 3: If $c_{e1} > c_{e2}$ and $c_{s1} = c_{s2}$ or if $c_{e1} < c_{e2}$ and $c_{s1} = c_{s2}$

In this case, for communication until seconds the company that has lower call connection cost will be more economical. For communications with duration higher than seconds, we consider the lineal function of the cost function . This function between these two companies differ in origin ordinate but they have the same slope, so the most economical company will be the one that has the lowest call connection cost.

Case 4: If $c_{e1} < c_{e2}$ and $c_{s1} < c_{s2}$ or if $c_{e1} > c_{e2}$ and $c_{s1} > c_{s2}$

In this case, for communications that last are under t_e seconds, the company which has higher call connection cost (c_e) will be the one which has higher communication cost.

For communications that last over t_e seconds, the cost functions involved differ in origin ordinate and slope, so it is necessary to know if there exists a point where the communication cost is the same for both companies. To know this point, we set out:

$$c_{e1} + c_{s1}(t_i - t_e) = c_{e2} + c_{s2}(t_i - t_e)$$

To $t_i = \frac{c_{e2} - c_{e1}}{c_{s1} - c_{s2}} + t_e$ the communication cost for both companies is the same. Here, $t_i < t_e$, because if the quotient sign $\frac{c_{e2} - c_{e1}}{c_{s1} - c_{s2}}$ is analyzed to $c_{e1} > c_{e2}$ and $c_{s1} > c_{s2}$ or to $c_{e1} > c_{e2}$ and $c_{s1} < c_{s2}$ is always negative. The two functions intersect in a point where $t_i < t_e$. This is impossible for the valuation type proposed. Therefore, after t_e seconds of call connection establishment, the communication will be more economical for that company which has lower seconds cost.

From this analysis it is worth asking:” How long t_e will this comparison go on?” It is necessary to consider the available credit to full consumption since some companies modify the call connection and second cost as more credit is required. This is the case of Company 1 plan. Thus, the comparison will be possible until the lower value between

$$\left[\frac{c_{r1} - c_{e1}}{c_{s1}} + t_e \right] \text{ and } \left[\frac{c_{r2} - c_{e2}}{c_{s2}} + t_e \right].$$

Another typical situation that can emerge of the above study is:

Situation 10

What is the cost of a second?

To answer this question, it is necessary to analyze the information given by the cell company instead of an immediate answer from the fee tables.

The average cost of t seconds call can be represented thus:

$$c_m(t) = \begin{cases} \frac{c_e}{t} & \text{si } 1 \leq t \leq t_e \\ \frac{c_e + c_s(t - t_e)}{t} & \text{si } t_e + 1 \leq t \leq \left\lfloor \frac{c_r - c_e}{c_s} + t_e \right\rfloor \end{cases}$$

$$Dom(f) = \left\{ t \in \mathbb{N} / 1 \leq t \leq \left\lfloor \frac{c_r - c_e}{c_s} + t_e \right\rfloor \right\}$$

The expression $c_m(t)$ corresponds to a function defined by two branches. Each branch corresponds to rational functions.

The Study of situation 10 leads to the analysis of rational function. In particular, the study of what value the function tends to as time goes by. This implies the analysis functional asymptote and the deepening in the study of the relation between call duration and $c_m(t)$. For this reason, the following situation is studied.

Situation 11

How do call duration and $c_m(t)$ relate?

The average cost $c_m(t)$ decreases for any time t of call duration because the call connection cost (c_e) and the second cost (c_s) are positive and $c_e > c_s t_e$. This means that the longer the call, the lower the average cost.

For calls that last between 1 and t_e seconds, the function $c_m(t) = \frac{c_e}{t}$ is considered. Using the first derivate it is possible to verify that this function decreases as t increases. If t increased indefinitely, the average cost would be closer to zero.

However, this is limited for the companies study case because $t \in \mathbb{N}$ so $1 \leq t \leq t_e$. On the other hand, the function has a vertical asymptote and this is verified resourcing to the study of function limit when t tends to zero.

Using the same techniques as in the previous case, for calls longer than t_e the function $c_m(t) = \frac{c_e + c_s(t - t_e)}{t}$ has a horizontal aympnote $y = c_s$ (This can be demonstrated by studying the function limit when $t \rightarrow \infty$) This means that for communications longer than t_e seconds the price per second is close to (c_s).

The study does not stop here. The companies offer ways of payment such as prepaid or monthly fee. Likewise, same companies offer additional cost to fee depending on the call distance.

This study focuses on analyzing the call connection cost, however we should come back to the initial situation. It is necessary to suppose situations such as: If a person did not have cell company, which one should he choose? If a person had the cell company, should he opt for a better company or the plan within the same company?

As synthesis of the study I propose the following situation:

Situation 12

Cell company user is dissatisfied with his hired plan. Write a report that allows the user to take a decision bearing in mind his possible needs.

Conclusion

In this work, the essential characteristics of a didactic device are described. This didactic device allows to make gesture typical of the research pedagogy. The initial situation addresses a current situation that is of social interest. The study allows to re-find the usefulness of the different mathematical praxeologies and link them to the study of a real situation, giving answer to questions such as: How to use functions to real problems? How to choose the most economical fee to talk by cell phone? How to compare cell company fees? The study also allows to understand the ways cell companies charge and the fact that we can always talk t_e seconds because the companies charge this minimum fee although the communication is shorter.

In particular, the study of the initial situation leads to rediscover the functionality of mathematical praxeologies as: descriptive statistic, constant function, lineal function, rational function, function defined by branch, roof function, floor function, estimation by round and truncation, lineal equations and inequations, system of lineal equations, continuous and discrete of function, limit and continuity of function. The development of this didactic device in current conditions at high school in Argentine requires to go across praxeologies studied in different years and to introduce praxeologies that are absent in the curricular design.

In this work, the study of algebraic techniques was deepened. However, graphics and arithmetic techniques can also be applied. The graphic technique allows not only to contrast information obtained by arithmetic or algebraic techniques, but also to obtain information to start its interpretation that will be contrasted with other techniques after wards.

In relation with the gestures of the research pedagogy that may operate in the situation study, the following ones are the most relevant. The management of the didactic device can generate a rich set of questions, which is a fundamental gesture of research

pedagogy: The study and research dialectic. In this study, the formulation of questions has vital importance.

The media and middle dialectic is another gesture that could come into play with the proposal. The formulation of question by the community and the information provided by several media (mathematics book, web page of the companies, internet, etc.) will contribute to the middle and provide an answer to the initial situation.

In this study the dialectic of getting in-and-out of topic would also be present. So, giving answer to some questions requires to deepen several mathematical notions. Linked to this dialectic, it is necessary to analyze what knowledge is appropriate to solve the questions and how it is deepened. The grey level must be regulated because some praxeologies are studied without the depth expected by the scholar culture.

On the other hand, the teacher's role is fundamental to progress and hold the problematization of the initial situation. The teacher must become omniscient so that the student can assume the responsibility of making questions and searching for the answers, proposing and studying concrete situations. The answers must be validated by the experience and knowledge of the students and the check between the work groups and the teacher. This addresses the individual and group dialectic.

Some experimentations of the didactic device with mathematics teacher training (Corica and Otero, 2016) give evidence about the conditions that affect the economy and ecology at current high school in Argentine.

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Learning to Appreciate Intercultural Differences as a National Resource (Effective Intercultural Responsive Teaching)

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Introduction

To teach a foreign language is to teach its culture, language without its cultural materials is useless. However it is not easy to do such challenging task. When the teacher should mediate between two completely different cultures; he finds himself obliged to be selective, neglecting some aspects of the target culture, while forgetting that ignoring something does not make it goes away. We all see the world through cultural glasses and the lense through which we view this world shapes our reality.

What is Culture?

Culture is a dynamic construct of passing on the norm, behaviours, attitudes and other cultural items. Geertz (1973) defined culture as a “historically transmitted pattern of meanings embodies in symbols... by means of which men can communicate, perpetuate and develop their own knowledge about and attitudes towards life.”(p.89). Hofstede (2005) argued that culture is “software of the mind”. Porter (1991) explained culture as a medium that touches and alters all aspects of human life. A simple and brief definition of culture is : system of behaviours that helps us act in an accepted or familiar way. It is the way we think, act, and interact. We are all the same, all different and partly the same and partly different. We are all the same as far as our human nature is regarded, completely different as far as our personalities are regarded ; and culturally speaking we are partly the same and partly different.

Components of Culture

- **Symbols** : are things which represents other things. It can be both abstract or concrete, each particular culture has its own and specific symbolic elements.
- **Language** : is a system of words and symbols used to communicate with other people. There is no culture without language. This latter enables us to invent, share, save and transfer those cultural meanings. It is through language people have their sense of identity.
- **Values** : are general abstract rules and principles which determine what is right or

wrong, accepted or unaccepted.

- **Norms** : are specific instructions for behaviours established by values. They refer to the guidelines that define what is conventional and expected from us and from other people in various situations and settings.

Teaching Intercultural Communicative Competence (ICC) is Teaching Tolerance

Intercultural communicative competence, or ICC, refers to the ability to understand cultures, including your own, and use this understanding to communicate with people from other culture successfully. In Byram’s (2000) viewpoint, ICC is “the ability to interact effectively with people of cultures other than one’s own”. (p.297). To put it differently, ICC, involves awareness of different values & behaviours of the others as well as skills to deal with them in a non-judgmental way. Byram’s (1997) Model of Intercultural Communicative Competence was used in foreign language teaching, the model was conceptualised in a number of basic competences of intercultural speaker:

- **Skills of Interpreting and Relating (savoir comprendre):** the ability to interpret a situation or ideas from another culture, to explain it and relate it and link it to one’s own culture.
- **Skills of Discovery and Interaction (savoir apprendre/faire):** the ability to acquire new ideas and knowledge of a culture and monitor this knowledge, attitudes and skills in real life communication.
- **Intercultural Attitudes (savoir être):** curiosity and openness and willingness to relativise one’s own values, norms, behaviours and see them from an outsider’s perspective.
- **Knowledge (savoirs):** people’s products and practices and the general processes of social and individual interaction.
- **Critical Cultural Awareness (savoir s’engager):** the ability to evaluate critically and on explicit basis of perspectives, practices and products in one’s own and other cultures.

Table 1. Byram’s ICC Component Chart (1997, p. 34)

	3. Skills Interpret Relate	
2. Knowledge Of the self and other; of interaction: individual and societal	5. Critical Cultural Awareness (Education) Political Education	1. Attitudes Relativising self Valuating other
	4. Skills Discover and/or Interact	

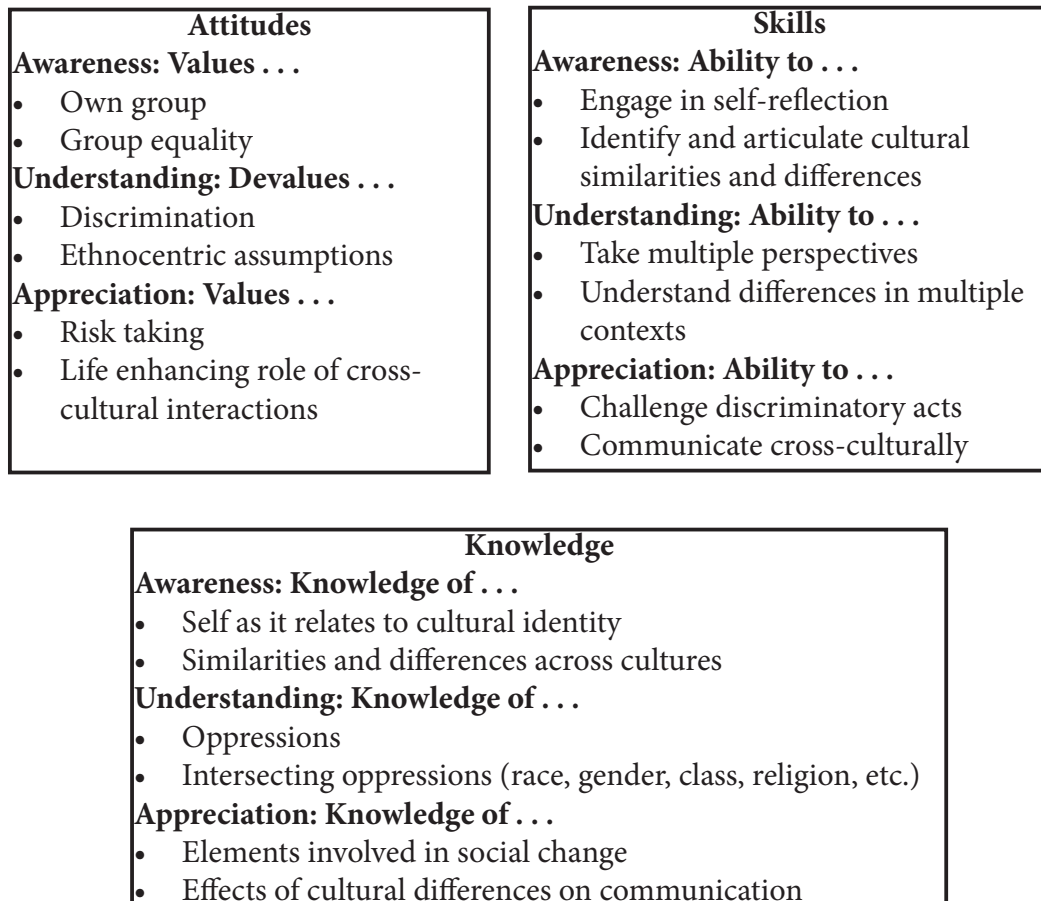


Figure 1. Intercultural Competence Components Model: Adapted from Howard Hamilton et al. (1998)

Tomlinson (2001) holds that cultural awareness involves a gradually developing inner sense of the equality of cultures, an increased understanding of your own and other people's cultures, and a positive interest in how cultures both connect and differ (cited in Tomlinson & Masuhara, 2004, p. 3). According to Tomalin and Stempleski (1993), cultural awareness includes three elements:

- awareness of one's own culturally-induced behaviour
- awareness of the culturally-induced behaviour of others
- ability to explain one's own cultural standpoint (p.5)

For an ICC Teacher there are three steps to pass through:

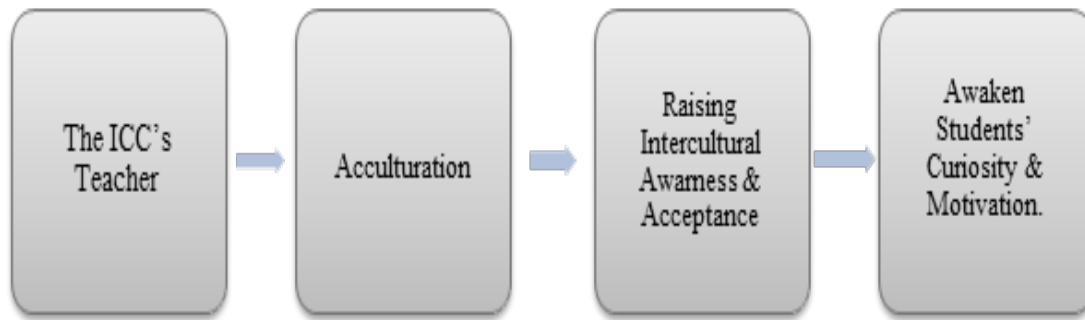


Figure 2. ICC Teacher's Role

The teacher helps students become familiar with the theoretical framework of intercultural communicative competence. This is through defining terms like culture, acculturation, intercultural communication and intercultural competence. The task of the teacher is not to provide comprehensive information or bring the foreign society into the classroom for learners to observe and experience; but to develop in students the competence that will help them relativise their own cultural values, beliefs and behaviours and investigate for themselves the otherness, what is different from their "norm". One example is understanding that economy of language is just a matter of cultural perspective e.g., Italian and Indian people tend to express themselves in a very detailed manner, however; in UK or Germany people are more concise and precise. The idea of individualism/collectivism is differently perceived, when the US is highly individualist country while china is more a collectivist country. Teachers assist their students better understand one's own cultural identity and how it is formed as well as to understand what unities or separates people from different cultures. So that they can avoid and break stereotypes. Yet dealing with culture clashes and culture shock. That is how students can share a common understanding of the key concepts of intercultural communication as well as being able to accept and deal with things from intercultural perspective. Indeed effective intercultural responsive teaching is necessary and crucial to t the teaching-learning process.

Baxter Magolda (2005) provided a representation of levels of progressive competence. By identifying initial, intermediate, and mature levels of intercultural development and explaining the progression of students' competence. This model attempts to identify the levels of awareness of, sensitivity to, and ability to adapt to diversity across cultures. Low levels of awareness typify less competent modes of intercultural interaction, and high levels of awareness typify more competent modes of intercultural interaction.

Initial Development Level	Intermediate Development Level	Mature Development Level
<p>Cognitive</p> <ul style="list-style-type: none"> *Categorical knowledge *Naive about cultural practices *Resists knowledge challenges <p>• Intrapersonal</p> <ul style="list-style-type: none"> *Lacks awareness of social role intersections (race, class, etc.) * Lacks awareness of cultures * Externally defined beliefs * Differences viewed as threats <p>• Interpersonal</p> <ul style="list-style-type: none"> * Identity dependent on similar others *Different views are considered wrong * Lacks awareness of social systems and norms * Views social problems egocentrically 	<p>• Cognitive</p> <ul style="list-style-type: none"> *Evolving awareness and acceptance of perspectives *Shift from authority to autonomous knowledge <p>• Intrapersonal</p> <ul style="list-style-type: none"> * Evolving identity distinct from external perceptions * Tension between internal and external prompts * Recognizes legitimacy of other cultures <p>• Interpersonal</p> <ul style="list-style-type: none"> * Willingness to interact with divergent others * Explores how social systems affect group norms and relations 	<p>• Cognitive</p> <ul style="list-style-type: none"> *Able to consciously shift perspectives *Use multiple cultural frames <p>• Intrapersonal</p> <ul style="list-style-type: none"> *Able to create internal self *Challenges own views of social identities (class, race) *Integrates self identity <p>• Interpersonal</p> <ul style="list-style-type: none"> *Able to engage in diverse interdependent relationships *Ground relations in appreciation of differences *Understands intersection of social systems and practices *Willing to work for others' rights

Figure 3. Intercultural Maturity Model: Adapted from King and Baxter Magolda (2005, p. 576).

Hofstede's Cultural Dimension

A theory that compares unique and specific aspects of culture :

- **Power Distance** : this dimension expresses the degree to which less powerful members of a society accept and expect that power is distributed unequally.
- **Individualism vs. Collectivism** : this dimension focuses on the questions about whether prefer a close knit network of people or prefer to be left alone to fend for themselves.
- **Masculinity vs. Femininity** : masculinity represents a preference in society for achievement, heroism, assertiveness and material reward for success.
- **Uncertainty Avoidance** : this dimension expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity.

- **Long-term vs. Short-term Orientation** : long-term orientation can be interpreted as dealing with society’s search for virtue. Societies with a short-term orientation generally have a strong concern with establishing the absolute truth.

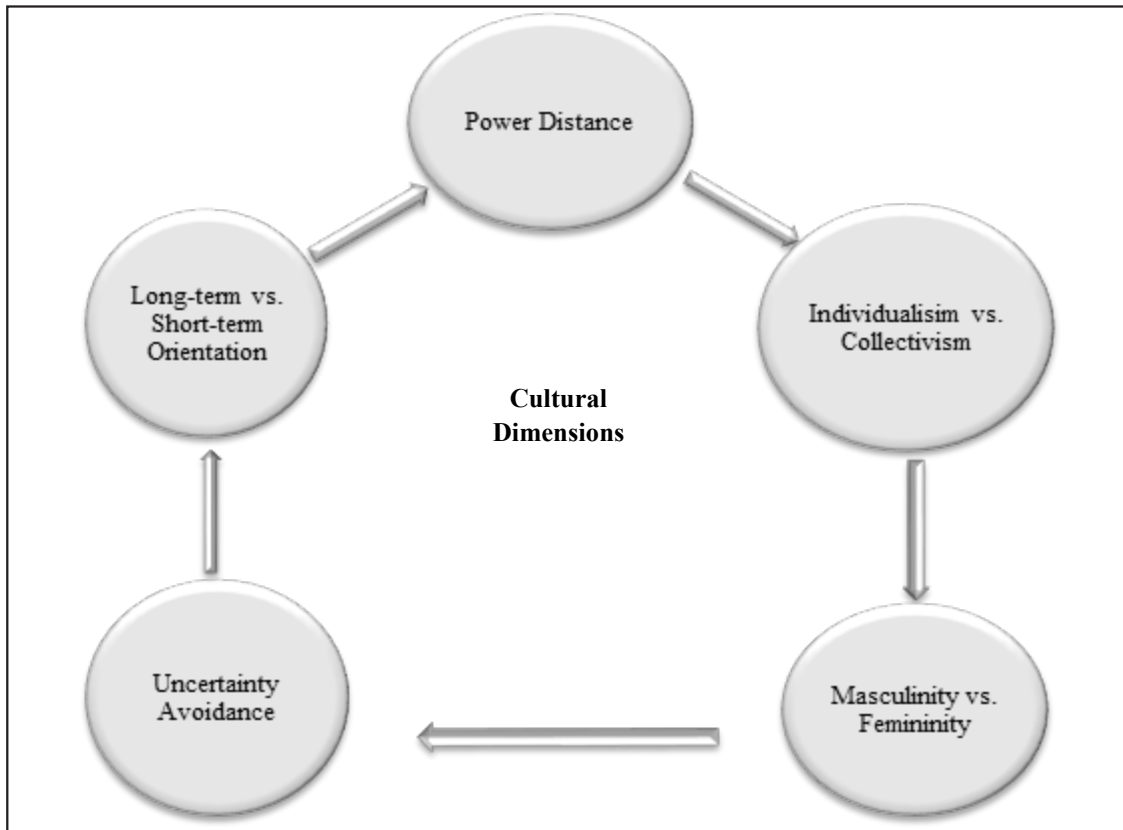
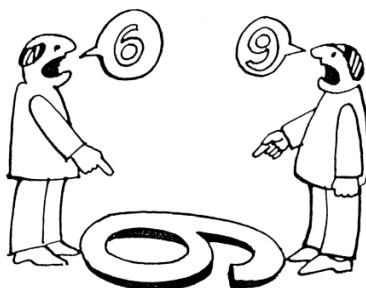


Figure 3. Hofstede's Cultural Dimensions

The Pedagogy of Stereotypes and the Danger of One Story

Lippmann’s conceptualisation of stereotypes (1922) as “pictures in our heads” (p.3). Elligan (2008) stated that stereotypes are cognitions of one social group about another social group. In cognitive linguistics, Geeraerts (2006) stereotypes are regarded as a mental category easily applied to all members of that category. Pinker (2003) found that “... people’s ability to set aside stereotypes when judging an individual is accomplished by their conscious, deliberate reasoning” (p.205). People see what they want to see and they don’t see what you see.



Levin and Adelman (1982) stated that there are a number of reasons behind cultural conflicts and clashes such as ethnocentrism, stereotypes, misinterpretations and prejudice. People need to avoid those clashes through increasing awareness of both, their own attitudes as well as cross cultural differences. Raising intercultural awareness is recognising and understanding cultural influences rather than losing our cultural identity.

Conclusion

The need of preparing students who are interculturally responsive is one of our century's essential demands. In the classroom, being culturally competent is understanding how cultures differ under the surface and how cultures react differently to similar situations. Teachers should develop their students' cultural knowledge and cross-cultural communication skills, as well as strategies to extend their cultural knowledge. Teachers' awareness and understanding of the basic elements in intercultural communication is essential for students' development in any cross cultural situation.

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Teaching Financial Management Skills for Arabic Speaking Young Adults with Specific Learning Disabilities in East Jerusalem

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It is crucial for youth with Specific learning disorders (SLD) to transition to adulthood with independency in life skills. A life skill that most SLD struggle with is “money” issues; they struggle with financial decisions due to their poor financial skills (Beyer, Kaehne, Grey, Sheppard, & Meek, 2008).. The fact is that most SLD youths’ families are in control of their finances, leaving these youths with little opportunities to see or experience how financial management works. Consequently, the ability for youth with Specific Learning Disorders to manage their money successfully is essential in allowing them to take control of their lives.

According to the National Association of Special Education Teachers (NASET report 3) students with Specific Learning Disorders have problems in both math calculations and math reasoning. Researchers have estimated that one out of four students with SLD have difficulties with mathematics (NASET report 3). This type of disorder is called Dyscalculia, interpreted as “selective impairment in mathematical thinking or in calculation skills” (NASET report 3). This disorder will ultimately affect the financial management skills of a SLD youth if intervention is not provided, and financial skills are not acquired by SLD youth. Yet solely Dyscalculia cannot be blamed, various other characteristics of a SLD youth can result in financial challenges (Dollars and Sense, 2016).

It is not easy for a youth with SLD to overcome these problems; and yet they grow more important as such youth face the challenging world of finance. Our Arabic speaking youth in Al-Afak school face the same problems and the same concerns in their ability to make sound financial decisions. In responds to their needs, a novel and unique school based curriculum was written in Arabic and will be implemented in Arabic. This curriculum provides our school professionals with numerous original ideas to assist our 152 students, ages 12 to 21, in making sense of their finances and supporting them on their journey to financial independence. Meanwhile, our students engage in activities, games, and projects that empower them to gain financial control.

Below is a table that illustrates some of these ways:

Impulsivity	Problems with impulse buying beyond the limit of budget
Memory problems	Difficulties remembering to record bank transactions
Temporal problems	Remembering to pay bills on time

Organizational problems	Difficulties gathering all the items necessary to balance one's checkbook
distractibility	Maintaining concentration during the process of reviewing checking account
Visual discrimination	Making errors in calculation due to number inversions
Special issues	Tendency to misalign numbers in the check register columns
Visual figure-ground problems	Focusing on individual lines of the monthly bank statement
Reading	Trouble reading store signs, price tags, bank notices, contracts, monthly membership dues
Spelling	Difficulties spelling out numbers on a check
Math	Performing mental math(how much change to expect, cost of item on sale at 25 percent)

The Emergence of Curriculum

The idea behind providing financial management to our youth is not new to our school. We have always had a simulation of a bank on the school premises, yet in retrospect it was lacking in purpose and intent; it was too limiting to all the needs of our youth. After examining and evaluating our program, and then exploring and researching approaches, we expanded on the "bank" project to be incorporated into a larger life skill concept, Personal Financial Management and Bank services.

The Curriculum

The school based curriculum is 108 pages long and is divided into four sections: attitudes towards money and values, prioritizing and developing a budget, cost of independent living, and finally, banking services. The structure of every activity includes: activity goals, teaching goals, requirements for the activity, the process, teaching guidelines for the teachers, and worksheets for the students.

Learning Objectives

Each section provides the teacher and the student with learning goals and objective that assist the teachers with their EIP plans and aid the students in their learning aims. The following is a list of the learning objectives in each section:

Section One: Attitudes Towards Money and Values:

- Our students understand that saving is a way to get what they want
- Comparing and contrasting student's attitudes towards spending

- Present Dilemmas that introduce students to safe and effective solutions; example: asking for help
- Exposing our students to the truths behind many myths surrounding money

Section Two: Prioritizing and Developing a Budget:

- Our students understand where their money comes from
- Students recognize the difference between needs and wants
- Students prioritize needs to develop a budget
- Students realize how much money they spend, and how they can save

Section Three: Cost of Independent Living:

Exploring the cost of things

- Furniture
- House items
- Everyday items
- Making breakfast
- Cooking a hot meal

Students explore through shopping, comparing and contrasting prices of supermarket and high end stores with local products and local merchants in order to stay within budget.

Section Four: Banking Services:

- Choosing a bank that suits needs
- Learning terminology related to bank services
- Document needed to open a checking account or savings account
- Calculating annual interest
- How to use an ATM
- How to write a personal check

All of our SLD youth will be working at different stages in their development and understanding of money and financial skills. Therefore, the school based curriculum begins with the most critical part of the process of teaching, an evaluation assessing pre-existing knowledge of the youth with the subject. This evaluation is simple and fun, written in both text and pictures to help those youths with dyslexia to accomplish the task independently or with little assistance. Accompanying the evaluation is the answer sheets which permits the youth to discover their area of strengths as well as their areas of weaknesses. The teacher can use the results as a base-line to plan activities accordingly. The teachers can also come back to the evaluation, after some activities, and measurement the progress of each youth in their development and understanding.

A requirement for many activities is community visits to shops, supermarkets, banks, and local stores in order to experience finance at work. The youth gain on site skills, understanding and firsthand knowledge of financial management.

When will the Curriculum be Applied?

The consensus from the school staff has fallen on one session a week per class. This one session will be taken from the 6 sessions of math given to each class per week.

Momentarily, the curriculum is being presented to the students and the evaluation is being implemented in each classroom. Once the results of the evaluation are been obtained, the youths will be divided into learning groups, IEP plans will be written, and work will begin.

Conclusion

With this school based curriculum in hand now, our work will be given unification and direction for our professionals when working with our youth with SLD. It will also provide our youth with a vital life skill presented simply through fun activities, games and projects. We, at the Afak School, feel obligated to ensure our youth with the best possible skills and advantages when making financial decisions. We feel responsible to provide our youth with information, education, and guidance, to enable them to make sound judgments when faced with day to day financial tasks.

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Postmethod Era in Education

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Literature Review

Language is a social practice which creates by language learners, understand themselves, the environment, and future possibilities (Norton; Toohey, 2004). Today language is an essential tool for conveying meaning and purposes to other humans and communicate them professionally. In language learning and teaching principles, there are lots of views and methods to use the language as a useful tool among humanbeings. In this paper, I'm going to look at postmethod era to manifest the idea which is providing the situations to learn and teach language as much as possible referring to postmethod condition. Celce-Murcia (2001) mentions language as a system for communication focuses on actual use of the target language and integration of language and skills.

Postmodernism has influenced TESOL through postmethodism which is officially introduced by Kumaradivelu in 19910s; postmodrernism is a philosophy of mind that appears in disciplines or areas to study art, music, film, literature, and even technology that is first originated in France during the 1960s and 1970s and it has been greatly influenced by naturalism, Marxism, structuralism, existentialism, and psychoanalysis, the modern scientific which has roots in the Enlightenment. As Hashemi (2011) says postmodernism denies any fixed meaning, reality, truth or correspondence between language and the world of enquiry, that's why ELT requires a fundamental shift toward postmethod, it entails a greater awareness of issues. Richards (2008) points out "it is viewed that English is a property of English-speaking world wide but it is an international commodity that it is sometimes detached from its geographical and cultural origins. There is no doubt that we are living in a globalized world with little agreement; debate over the merits and demerits of globalization; it should be regarded as a homogenizing process continue to the third millennium. From the individualistic view and learner-centered approaches to learn language, postmethod rejected the belief in one size all fits all method, it has arisen with the concept of localize teaching materials in order to put a better particular language needs into a specific context. If we regard it as an international geography of English language teaching to use it properly in another context that it advocates the idea of localization and globalization in modern life which has been introduced to the literature to advocate the slogan think globally, and act locally. Diversity is essential for social life but globalization does not erase all those differences.

There is a shift from conventional concept of method toward a postmethod condition, a change from top-down to bottom-up process. Postmethod can help L2 teaching by empowering teachers with knowledge, and it potentially can shape the relationship between teachers and theorizers. There is a sudden change from conventional to post modern methods of becoming robust reflection to bring evaluative thoughts on the nature of methods, that's a product of professional knowledge which is aimed at creating set of principles and classroom practices that can be used at any time in everywhere and anywhere. The framework of postmethod is constantly searching for open-ended and practical terms based on empirical and pedagogical insights that reshape a specific design for classroom research and creates situation-specific microstrategies; the concept of method is finding an alternative way to follow up an effective teaching experience in L2 teaching and learning approaches. In the history of second language teaching and learning some methods are framed in formal or linguistic properties language, as Kumaradivelu argues that the concept of method has limited impacts on language teaching and learning, soon there is needed to pack an alternative to method not an alternative method. Kumaradivelu's perspective draw his attention to take a holistic approach to L2 language teaching. Postmethod goes beyond methods to bring up practitioner teachers to make transformation from the old one to new pedagogy's view and become aware of ideational aspects to develop themselves as a teacher and provide them with micro and macrostrategies influencing on ELT. In the past few years, evaluative thoughts have been arisen on the nature of method in the mind of many linguists such as Allwright, Brown, Larsen-Freeman, Penycook, Richards, Widdowson, and Prahbu, the emergence of alternative ideas came from Kumaradivelu, Richards& Lockhart, Rivers, Stern, and postmethod era has recently been researched and exemplified in real classroom practice by Elham Zakeri in 2014.

In the English-speaking world, Kumaradivelu explores that top-down traditional nature of methods considering learners as passive recipients; one step forward to define the concept of "marginality" that invites practitioners to find a systematic, coherent, and relevant *alternative to method rather than alternative method*. From the practitioner's point of view, methods are not derived from actual classroom experience, they cannot be realized in purest form in real classroom, and a particular method does not really conform its principles and procedures. It signifies teacher autonomy, the conventional concept of method relies on knowledge about teaching that teachers have already made the curricula, however postmethod considering how to teach and know how to act autonomously. It is principled pragmatism unlike the eclecticism, that is a relationship between theory and practice, and it focuses on how classroom learning can be managed by teachers lead to critical teaching.

Parameters in Postmethod Era

Kumaradivelu conceptualizes three parameters for postmethod pedagogy; particularity, practicality, and possibility. For the first parameter, situations determine how to teach socio-cultural and political issues, and it is relevant to a specific group of teachers teaching a particular group of learners that follow up particular set of goals within a particular context, as Prabhu (1990) points out that is a relationship between teaching context and applied methodology. The second parameter practicality advocates applicability of a method in actual situations, we cannot use that theory otherwise it should be applicable when we put it into practice. Kumaradivelu says the teachers who attempt to derive a theory from their practical situations, are going to develop deep insights into problems and difficulties associated with language teaching, that's why some teachers are unexpected and they have an unexplainable sense which is set to their teaching goal as we call it teacher's sense of plausibility, the practicality is a concept with the degree to which a method is applicable. The third parameter is pedagogy of possibility which takes into account the critical dimension of language teaching. It is concerned with social, political, historical, and economical situations that affect the lives of learners and teachers through classroom activities, this parameter emphasizes the need to develop theories, and social practices through experiences which people may have involved in their life span, the possibility is the relationship between techniques that teacher employs in language instruction when, where, and whom they are teaching. These three parameters have important and useful implications for language teachers, and help preparing them to overcome problems on their path. The new era based on Kumaradivelu's (2006) explanation, is the postmethod era which means a particular group of teachers teaching a particular group of learners following a particular set of goals within a particular institutional context embedded in a particular socio-cultural milieu.

Finally, it is believed that a method should be flexible to different teaching situations and different learners' needs. As Prabhu (1990) says practicality means teacher's sense of plausibility that it refers to teacher's skill in monitoring effective teaching of her own, and possibility is about successful teaching with regarding the social issues, language ideology, and learner's identity.

Features of Postmethod Pedagogy

Postmethod era provides helpful guidelines for both teacher and researcher. Kumaradivelu offers a framework that is based on particularity, practicality, and possibility; develops into ten macrostrategies, it is implied by all authors that is increased the responsibility of a teacher to promote her knowledge based on different situations, and to be highly professional during teaching process, teachers are also expected to

design communicative practice, and it could be well replaced by post-CLT. It is providing a condition for teachers and practitioners to actively use materials, and be aware of their potential, empowering them for the curriculum, it can help teachers to be autonomous, to put their students into practice by teachers' sense of plausibility to prepare them for real life. It help learners by ten macrostrategies to manage all problems to find solutions. It globally and locally presents teaching context, assessment, procedures, and teaching materials that should have been modified to include communication oriented activities. A new trend in pedagogy is offering to replace methods with professional strategies and skills. The language teacher is the key part to the implementation of the negotiation process in postmethod syllabus, and teachers should be seen simply delivers of fixed syllabus but they should also be seen as reflective professionals who frame and reframe problems and find solutions in action research. It favors learner-centered curriculum but highly teacher-dependent. Subjective understanding of teaching may arise. Teachers need to act with some personal conceptualization that how their teaching leads to desired learning. The other characteristic is principled pragmatism which is different from eclecticism. The eclecticism aim to promote the careful, combination of ideas from sources and whole gets into harmonious best result (Hammerly, 1991). In spite of that good feature eclecticism at classroom level goes unsystematic, unprincipled, and uncritical pedagogy because the teacher is less professional in a principled way with little option. As Stern (1992) points out that there is no criteria to determine which theory is the best, and no principles, that is the weakness of eclecticism. But principled pragmatism provides systematic, principled, and critical pedagogy.

The Learners' Role in Postmethod Era

Learner is an autonomous learner in postmethod including two interrelated aspects of autonomy; academic autonomy and social autonomy. When learner is willing to take charge of her own learning to become autonomous, taking charge means teacher giving learner a set of cognitive, meta-cognitive, and affective techniques to lead for successful learning. Postmethod provides a situation that learner can identify learning strategies, and styles by administering or having administered their own language teaching histories. It provides them to develop strategies that are associated with analytical learning style. It enables learner to evaluate their ongoing learning outcomes. It gives opportunities for additional language reception or production. Unlike academic autonomy, social autonomy relates to the learner's ability and willingness to function effectively as a cooperative member of a classroom community. It provides teacher to get adequate feedback on the areas of difficulty to solve the problem. It manages the advantage to communicate with competent speakers. They can investigate and understand how language rules and language use are socially structured. It can help learner to provide opportunities to explore unlimited possibilities.

The Teachers' Role in Postmethod Era

The teacher here is also autonomous, it provides the teacher to build and implement their own theory of practice to the possibilities of sociopolitical conditions. Teacher autonomy shapes by professional and personal knowledge that evolves by formal and informal channel of educational experience. In L2 teaching most teachers enter into professional knowledge. Although it is highly satisfying to see robust teaching encounters with certain aspects of particularity and practicality, teachers must encourage themselves to possibility as well. They design to transmit a set of preselected and presequenced body of knowledge, teacher autonomy is not aimed at ready-made package of knowledge and easy reproduction of knowledge. It helps teacher to self-autonomy and self-development, they have to negotiate what institutional programs speed up learning. A postmethod teacher education must take into account the importance of recognizing teacher's voices and visions. The teacher in postmethod era firstly has to identify a puzzle, reflecting, and monitoring the problem, she can take direct actions, and shares her exploration with others, so the local practice is the central focus of exploratory practice. She can conduct action research to resolve the classroom problems. Teachers can develop a deeper understanding of many issues. Teacher in postmethod era is the heart of postmethod pedagogy (Kumaradivelu, 2006). In fact teachers add, adjust, and revise the methods and approaches based on their real classroom.

A Strategic Framework for L2 Teaching

Macrostrategy1: Maximize learning opportunities

It is crucial that teacher strikes a balance between whether their role as planners of teaching acts or their role as mediator of learning acts. The nature of classroom is cooperative so the teacher cannot ignore contributory discourse, the teacher is simply as a teacher and the learner is simply as a learner because both of them are managers of learning. The teachers utilizes learning opportunities which is created by the learner.

Macrostrategy2: Facilitate negotiated interaction

This macrostrategy refers to meaningful learner to learner, and learner to teacher interaction, here there is no evidence to suggest that there is need for L2 learners to provide negotiated interaction, and language development. Several microstrategies can facilitate negotiated interaction that designing group activities is one of them.

Macrostrategy3: Minimize perceptual mismatches

There is another strategy to failure or success of the learner that is perceptual match or mismatch between teacher intention and learner interpretation. Kumaradivelu specifics 10 sources of perceptual mismatch as they are: cognitive sources- communicative

sources- linguistic sources-pedagogic sources- strategic sources- cultural sources- evaluative sources- procedural sources- instructional sources- attitudinal sources.

Macrostrategy4: Activate intuitive heuristic

One way to activate intuitive heuristic is to provide enough textual data, a great deal of grammatical data can infer directly through rules and indirectly through examples. Learner should find rule governing pattern. The other is empirical studies can cause to self-discovery which effects learner's comprehension and retention.

Macrostrategy5: Foster learning awareness

Rutherford (1987) says fostering LA is different from traditional notions of grammar teaching, LA treats grammar as a network system to interact. LA-based strategies have greater intellectual and instructional applicability. The teacher can create LA externally through teaching strategies and the learner can create LA internally through learning process which will happen by empirical studies.

Macrostrategy6: Contextualized linguistic input

Sweet (1964) argues that practical study of language should be connected to texts as a main foundation, the sentences should be practiced in meaningful contexts rather than taught in isolated. We should contextualize linguistic input for the learner which has beneficial effects of various linguistic components. It is necessary to give the learner pragmatic cues and meaning making process.

Macrostrategy7: Integrate language skills

Language skills traditionally divided into listening, speaking, reading, and writing, that we have already preferred to learn skills in isolated as organizing fundamental principle, as Savignon (1990) points out that we lost in encode and decode message sending. Putting them into manageable can show the interactive nature of language and language behavior, besides use of any skill can trigger communicative association with others. For example listening skill can lead to comprehend more sociolinguistic concept, so all skills are interrelated and integrated as a whole part of language.

Macrostrategy8: Promote learner autonomy

Learner autonomy is vitally important and the nature of language is also autonomous. It equips the learner to understand the meaning of self-direct and consciously to pose learning strategies. We learn from generic metacognitive, cognitive, social, and in addition, affective strategies that learner follow many individual ways of learning a language successfully. By autonomy, the learner step to psychological preparation and strategic training.

Macrostrategy9: Raise cultural consciousness

Stern (1992) says cultural teaching has cognitive component in terms of geographical knowledge, knowledge about differences, knowledge about target culture, knowledge about values and attitudes; an affective component in terms of interest, curiosity, and empathy; and behavioral component in terms of learner's ability to interpret culturally, which are the ways learners put themselves into appropriate ways of learning culture. We treat the learner as a cultural informant as well as the teacher, we can encourage learners to engage a process of participation and put them on knowledge and power.

Macrostrategy10: Ensure social relevance

It is needed for the teacher to be sensitive to the societal, political, economic, and educational environment. That is essential to entail understanding social context as an important variable. Social context shapes various teaching/ learning issues such as motivation for L2 learning. Determining social relevance of L2 programs are most crucial for the purpose of learning. As Berns (1990) says different social context can cause to the emergence of various communicative competence and functions in L2. The teacher is going to follow whether a realistic goal or unrealistic one to produce native speech.

Major Criticisms

The identity of both teachers as well as learners are involved, identity is under question in postmethod era. Identity generally means who a person is? How people understand the relationship in a glob that is constructed through time and space (Norton, 1997). Karen (2002) says that identity is stable and unchanging. Identity in language teaching has led to a much more sophisticated understanding of language learners that is located in social, political, and cultural context that learners sometimes resist diverse positions in those contexts. As we do not have direct access to the learner, we put the learner in a competition model, mechanism of learning are both involved in first and second language acquisition as well as in the acquisition of other cognitive skills, in this framework language ability of the learner is the main part of educational context is the language ability of the learner that is connected to the network and updates cue strength, this cue is relating the appropriateness and interpretation of the sentence as an input, the competition model of the learner sharply contrasts universal grammar because it is considering poor input, and that is too far to justify the richness of the output(Chomsky, 2000). Identity is dynamic not static but people believe to normativity and resist to make changes until they feel that it develops their situational prestige or benefits them culturally or politically.

Postmethod still remains infancy and needs more research and practice, it is crystal clear that we will not come to final framework but to add blocks in teaching realm

(Zakeri, 2014). Teachers should be the authority in a community to make those transformations in critical pedagogy to actualize learning context. I mean teachers are poor members in the society that cannot make a lot of changes even in their classroom community because politicians, governed educationists and other authoritarians run the educational system in every nation.

We don't have enough contextualized textbooks which are actualized in real classroom activities in education system of learning/teaching a foreign or second language, and it is dominated by so many teachers, learners, and educationists who resist to diversity, they are almost poor knowledgeable people who don't want to make changes to produce textbooks in a particular context, and it is culturally damaged the society. It is said that possible cultural and ideological damages would have been caused by center-produced textbooks that has really been mitigated by teachers and learners in periphery communities who have recourse to resistance (Kumaradivelu, 2016).

Summary

The prefix "post" in postmethod does not mean the end of something or the final closure, it suggests a thinking through and beyond the problematics of that which is appended. Postmethod can potentially reshape the character and content of L2 teaching, teacher education, and classroom research. Postmethod is a three-dimensional pedagogy that all dimensions imply to determine principles and procedures at once, it rejects predetermining set of principles which are aimed to realize set of generic objectives. Instead, it is going to make an advancement of a context which is based on real understanding of local linguistic, sociocultural and political aspects. As people who are concerned about learning a language; in the postmethod era teachers are responsible to use different methods in classroom practices. Postmethod argues that it is needed to make fundamental changes in educational programs for teachers, mainly those changes toward educational programs for a critical teacher. Postmethod is killing methods which is going to argue that it is impossible to realize methods in purest form because methods are not upon classroom practices. Postmethod pedagogy is going to search the higher ground by advocating an alternative to method, and it is highly interested in knowledge. Postmethod has powerfully dialectical relationship with methods, and it imposes a bottom-up construct of practices. It gives us a warning to avoid one size fits all in method. Postmethod doesn't need to make a line at the end of methods but rather a deep understanding toward the limitations of methods and desire to pass those limitations.

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Reading between Lines and Going Beyond the Data – Towards a Qualitative Outlook for Quantitative Findings: A Second Reading of the Report ‘Completing University in a Growing Sector: Is Equity an Issue?’

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The report ‘Completing university in a growing sector: Is equity an issue? (Edwards & McMillan, 2015) is the most comprehensive analysis till date that elicits key trends and reasons for the completion or attrition of equity groups in Australian higher education. In the current context of overall increase in enrolment rates of students of all backgrounds, either due to the widening participation agenda or the demand driven environment it is important to understand which of the student cohorts have better chances of completion and which groups may face impediments (p.1). This focus is further pertinent because there is evidence that on successful completion of university, the employment and income prospects are similar for equity groups as well as their better off counterparts (Edwards & Coates, 2011). Although the report has specific focus on the key equity groups, vis-à-vis students from low socioeconomic backgrounds, non-metropolitan students and Indigenous students, this paper aims to provide a deeper analysis of the case of Indigenous students.

Indigenous students hold a special place in the context of and discourse about Australian higher education. They constitute students from both Aboriginal and Torres Strait Islander backgrounds. This cohort is special in that this is the only equity group identified as such based on their racial heritage. Furthermore, they are included on the sole basis of self-identification and this leaves the potential many Indigenous students remaining camouflaged in the non-identified or non-identifiable groups.

This report, like almost every other similar report in the past, does not consider the linguistic backgrounds as an identity marker to demarcate student cohorts. Therefore, in this report the outcomes have not been examined against the home language/s spoken by the students. This may be consistent with the traditional practices yet it continues to make the incorrect assumption that all domestic higher education students are of the ‘mainstream’ monolingual Anglophone background and therefore they all must be speaking Standard Australian English as their first language at home.

This linguistic non-identification is an issue especially given that there is a considerable and increasing number of Australians from diverse linguistic and cultural backgrounds entering school, vocational or higher education sectors. This is more so for the Indigenous students since there is a large number of them who speak their heritage language, a

creole or Aboriginal English as their first language. These students are from the English as an Additional Language or Dialect (EALD) backgrounds and therefore this paper will consider the report from this missing perspective.

The understanding of the characteristics and factors linked to lower completion of students from equity groups is critical to inform future retention policies for these groups at institutional as well as at national levels. This is even more pertinent for Indigenous students as many of them would have a multi-equity group membership and Indigenous students from an EALD background emerge as the most marginalised and disadvantaged among all other groups.

At the national level, other student category markers like students with low (below 60) Australian Tertiary Admission Ranks (ATAR), part-time students, students who study externally, students in STEM and Agriculture and Environment studies, students from the Regional University Network, students aged 25 and over and males have been identified by the report as additional risk factors.

Although the report identifies low SES, non-metropolitan and Indigenous students as its key focus the case of EALD Indigenous students warrants a much deeper analysis and this paper aims to dig deeper to elicit factors that have not been considered before and these factors could have significant impact on the participation and completion rates which in turn remain detrimental to the aims and aspirations of achieving parity and equity in higher education. Past data indicates that a male EALD Indigenous student with a below 60 ATAR, aged 25 or above at an institution in the Regional University Network, studying externally as a part-time student, studying STEM, agriculture or environment studies is almost certain to fail to complete their studies.

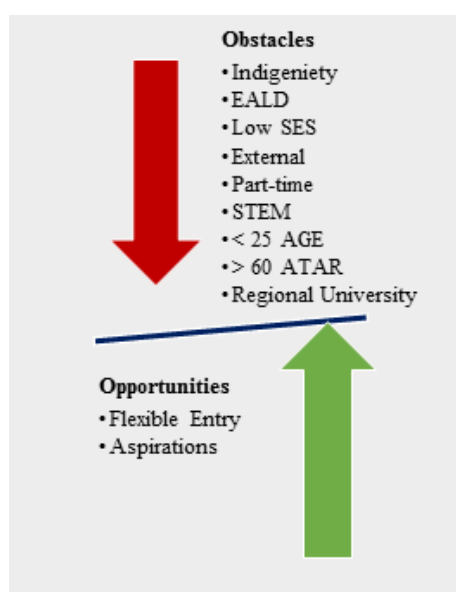


Figure 1. Obstacles Outweigh Opportunities for Indigenous Australians in Higher Education

A consideration of the widening participation agenda and the higher education participation and partnership program initiatives will concur that the Indigenous students commencing university education would have already proven their aspirations and would have relied on their perseverance to have gone past the significant milestone of securing a place to study at the university. Yet, it could be deducted from the analysis in the report as well from other known facts and factors regarding Indigenous Australians that they are being set up for failure by the sheer weight of systemic impediments.

Indigenous students entering university would have already transcended traditional barriers to reach such an aspirational and life changing goal. However, university access is only the first phase of their attempt to attain equity in higher education. Such an effort can be deemed successful only if they are also able to successfully complete their university education. Therefore, let us now consider the completion rates of Indigenous students.

The authors report that only 47% Indigenous students attain a successful course completion. What is of greater concern is the fact that over 'one in five Indigenous students in this cohort had dropped out of university before their second year' (p. v). Among them there could be many of those Indigenous who reach universities through the widening participation and flexible pathways options and could have availed aspirational support as envisaged in various HEPP projects.

Although these students have broken many barriers and achieved a momentous milestone, they do not last at the university beyond their first year. Moreover, the impact of this failure does not limit to just the increase in the attrition rates of a university, it could have scarred the self-respect and self-confidence of the 'failed' student and they may blame themselves to have 'failed' their people and community. The direct implications along with the psychological and attitudinal impacts of Indigenous student failure in higher education need to be investigated separately and this is beyond the scope of the current discussion.

The complexity of the context of Indigenous higher education and the essentiality of its success to enable progress toward social equity and educational parity necessitates a comprehensive understanding of the factors that impede educational progress of these students once they commence university education.

A closer scrutiny of the report confirms that it identifies many significance trends based on the University Experience Survey 2014 and highlights the correlation between the grades (self-declared) achieved by the students and them considering leaving the university. The tendency to discontinue studies was inversely proportional to higher academic achievements (2014 UES National Report, p. 33). However, many complex issues seem to have been clubbed under umbrella terms, understandably perhaps

because of the broader scope of the report. There seems to be practical and logical limitations in getting deeper into some of the parameters or influential elements reported in the document.

To its credit, the report has been forthright that there is ‘the potential for further exploration of higher education completion at an even finer level of detail to enhance understanding of factors impacting retention and outcomes’ (p. vi). However, to gain a comprehensive understanding of the nature and the extent of factors responsible for the alarming dropout rates of Indigenous students, an insight into some of the key areas of their student experience vis-à-vis their pre-entry preparations, chosen entry pathways, units of enrolment, completion – successful or otherwise – of the units enrolled and indeed their linguistic backgrounds is essential. This significance of such an understanding is that it will pave way for potential policies and practices to overcome and even pre-empt such debilitating impediments.

The report acknowledges and highlights the existence of the multiple at-risk groups and the most complex of them is the cohort of Indigenous students from remote or regional Australia, who are non-school leavers, aged over 25, from low SES backgrounds and who do not speak Standard Australian English at home.

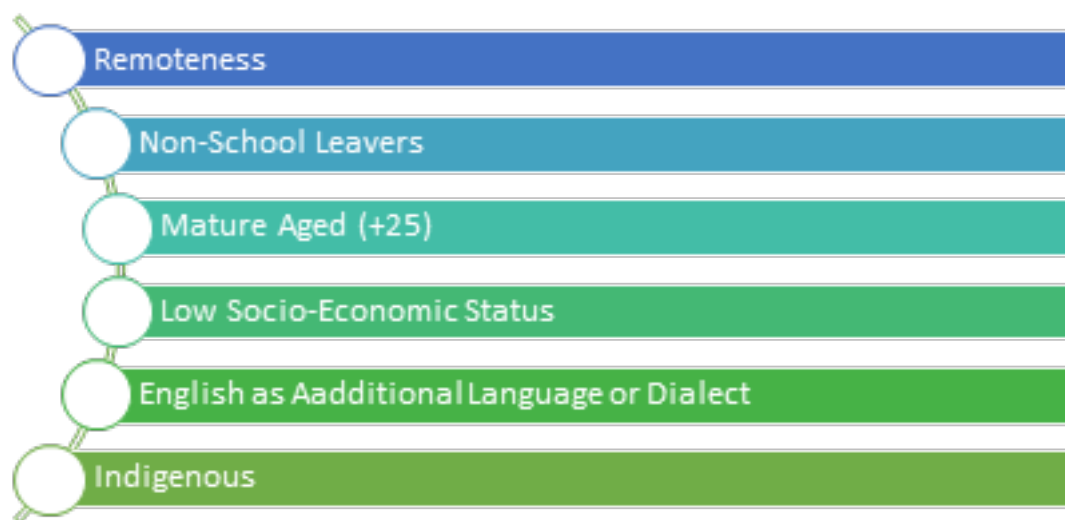


Figure 2. Equity Groups in Australian Higher Education

In addition, ‘studying part-time or externally, or having a low ATAR’ (Edward & McMillan, 2015 p. vi) are the other characteristics of student enrolment or demography found associated with lower university completion. Increased membership of equity groups results in proportionate increase in the disadvantage and is inversely proportionate to their completion rates. The University Experience Survey (UES) 2013 did not present any identifiable variation between the experiences of the equity groups and the others in the areas of the quality of teaching, availability of resources and student engagement.

A consideration of the later UES (2014) also confirms this lack of identifiable relationship between lower completion and any negative student experience suggesting that what is provided at and by the university is equitable and it is what a student brings to the university, in particular their socio-cultural and linguistic characteristics, that make the difference in their engagement and completion.

It also means that redressal of the issues around engagement and completion can be achieved only by providing targeted interventions at the university. In other words, equal amount of support is not sufficient to overcome the pre-existing disparities between equity groups and non-equity groups and that there should to be additional support frameworks in place for the equity groups once they arrive at the university.

The report also advocates for further research on macro and micro levels. At a macro level, equity groups' post-university progressions should be tracked and understood while at a micro level a 'finer grain' analysis is required of the data pertaining to small subgroups (p. vi). The analysis of graduate outcomes of equity groups on the lines of the 'Graduate Destination Survey, the Graduate Pathways Survey and the Beyond Graduation Survey' (p. vi). Given that there are indicative inferences that university completions enable the erosion of disadvantages of the equity groups on successful university completions, a detailed evaluation of multiple equity groups will provide foresight into potential support mechanisms to be installed at universities (p. vi). Such an analysis is therefore very significant for the efforts to achieve Indigenous parity in higher education and their post-university outcomes as it would enable informed targeted interventions to redress the inherent disadvantages of equity students.

If barriers to university access are being reduced by widening enrolment policies, and graduate employment outcomes are not notably impacted by equity-group background, then the next issue to address is ensuring that progression through university is not compromised by socioeconomic status, region or Indigeneity (Edwards & McMillan, p, 1, 2015)'. The authors of the report thus establish the need for a 'detailed baseline data' to make sense of the rate and the direction of university progression achieved by respective equity groups.

The wave of growth in university enrolment has been rode by students from all sections. If there was exponential growth from 2009 to 2013, a growth of 22% (Kemp & Norton, 2014, p.3), the growth steadied in the next two years (DET, 2015B). The growth in the initial four years was the largest since the 1980s (Edwards & Van der Brugge, 2012a). It is also significant that 'the increase in enrolments of students from equity groups has simply kept pace with the overall growth in enrolments' (Edwards & McMillan 2015, p.2). Once these students are successfully enrolled in universities, the report rightly turns its focus on 'to an ongoing dialogue about support, retention and completion' (p.2).

The basis of this report is the Commonwealth administrative database of undergraduate students since 2005 wherein the students' progress can be tracked by their Commonwealth Higher Education Student Support Number (CHESSN). In limited ways, this database has been analysed and reported initially by Lomax-Smith, Watson, & Webster (2011) in the *Higher Education Base Funding Review* and later by Kemp and Norton (2014) in their *Review of the Demand Driven Funding System*. However, neither of them had the outcomes of equity groups as their focus (Edwards & McMillan 2015). As indicated by Edwards and McMillan (2015) there have also been other studies about university completion including the Longitudinal Survey of Australian Youth (ILSAY) (Marks, 2007; McMillan, 2005, 2011).

Domestic undergraduate enrolment data from 2009 – 2012 (Kemp & Norton, 2014) indicates a dramatic growth of 25% in Indigenous enrolments, 22.2% in enrolment rates of students from low SES backgrounds and 16.3% growth in non-metro students. Yet when the share of overall enrolments is considered the growth margin differs significantly between Indigenous (0.1% change) and low SES students (0.9% change) or in other words, Indigenous student numbers grew from 7551 to 9441 an increase of only 1890 students.

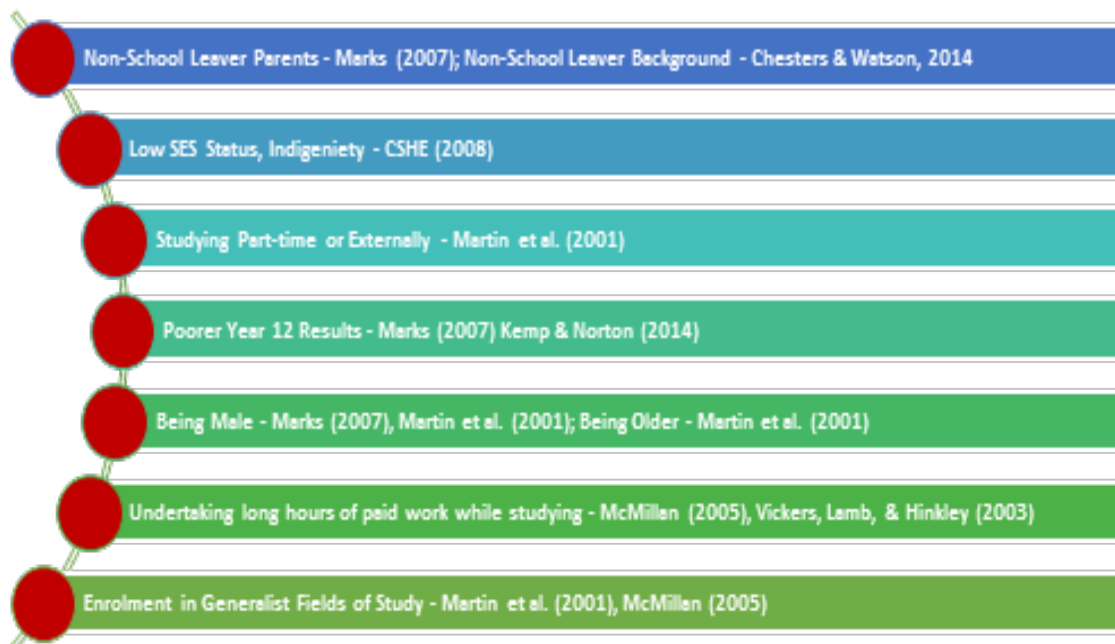


Figure 3. Indicators of Poorer University Participation and Completion

The report reiterates the need for further and closer scrutiny of data to make better sense of the real factors impacting negatively the university experience of equity groups and thus contributing to the significant rate of attrition. Therefore, to enable an earnest and sufficiently elaborate investigation of factors contributing to the attrition this paper will focus on the worst off and the most disadvantaged Indigenous student cohort who also could also have multiple equity group memberships.

Indigeneity remains the single significant and recurring factor that remains associated with the worst of all performances both in the case of enrolments and completions. The higher education student population had only 1.1 per cent Indigenous representation as per the 2011 data ((Edwards & Van der Brugge, 2012a) while their completion rate was the lowest at 46.7 per cent. This cohort experienced over 20% drop out rates before their second year and another 25% of them dropped out sometime after the first year. The most worrisome trend of all the high number of Indigenous students who had considered or who still consider leaving the university at some point in time. Thus, the difference of outcomes between Indigenous students and their non-Indigenous counterparts remained consistently substantial though out the report.

While lamenting the far below par enrolment and completion outcomes of Indigenous students in higher education, Edwards & McMillan (2015) also notes that the small number of these students and potential issues around accuracy and confidentiality curtails the potential to analyse the data to identify potential indicators of impediments and appropriate support to this group of potentially multi-equity group members. Yet there are some overarching trends identified like the likelihood of the Indigenous student cohort being 'older, part-time, regional or remote, and low SES, all variable associated with lower completion rates' (p. 22) and together with other analysis by the Department of Education reinforces that Indigeneity as a strong factor associated with higher attrition rates.

In a nutshell, approximately 47% Indigenous students achieved completion as against 74% of the non-Indigenous groups, a whopping 20.4% of Indigenous students never returned after their first year which is 2 ½ times worse than their counterparts. Another 25% (against 13.9% of others) Indigenous students dropped out some time after their first year at university and eight per cent Indigenous students have been prolonging their completion even after 9 years as against on 4.2 percent of other students. Considering the compounding impact of belonging to more than one of the equity groups discussed above many Indigenous students remain severely disadvantaged and adversely affected in higher education because many of these students could be aged over 25, belonging to low SES and coming from regional or remote areas.

These are significant findings and substantial to understand Australian university student progression. Yet, as envisaged by the report, it also raises more questions than answers about the components of English and academic language proficiency, their roles and implications for students who do not speak SAE as their home language. This question in particular is critical for the EALD Indigenous students given their well identified and evidenced multiple equity group membership and vulnerability to dropping out from the university.

It is therefore necessary to further examine the reasons for considering leaving university early to identify factors related to the linguistic backgrounds of students as well the (currently nonnegotiable) medium of instruction. This observation will focus predominantly on the Indigenous students and will also remain conscious of the fact that there could be students from Indigenous backgrounds who have not identified themselves as such among the 'not-stated' category, whose size comes to 82% of the size of those with Indigenous status. This approach is also justified given that the other negative factors including low SES and geographical locations have similar impact on all.

Table 1. Identified Key Reasons for Indigenous Attrition

Reasons for Dis-continuing	%	Further Consideration in the Case of EALD Indigenous
Workload difficulties	35.3	Could difficulties faced by these students with English language both in understanding study materials as well in articulating their understanding have made the 'workload' more daunting?
Study/life balance	33.2	Could these students be finding study more demanding than others, perhaps due to insufficient preparation and/or support including in terms of English/Academic language proficiency?
Personal reasons	27.2	Could these students be citing personal reason as an articulation of a lack of confidence in expressing and interacting in English? It has been noted that a lack of confidence in English leads to a diminished self-confidence for EALD Indigenous students.
Academic support	20.0	Could a great deal of this be related to insufficient support with the understanding study content and understanding and meeting assessment requirements? This is a major one given that one in five Indigenous students have identified this as a reason.
Academic exchange	10.2	Could this be impacted by a combination of difficulties in English/Academic language, self-confidence, foreign academic culture and a lack of sufficiently exposure to all these (alternate entry pathways could create such a situation)?

With 23.9% of Indigenous students considering early departure due to the reasons mentioned above along with the reality that 20.4% of Indigenous students never returned after the first year while a massive 25% of them dropped out sometime after their first year at university makes attrition the single major impediment in attaining educational parity for the most disadvantaged Australian student cohort. This severely undermines any positive change in enrolments as well the investment and efforts made in getting Indigenous students into a university. This guaranteed failure at the rate of 1:1 of Indigenous students commencing university education in Australia could also have damaging and long-lasting impact on the self-respect of the individual students, the prevalent family and community aspirations on which significant amounts have been spent in recent years through HEPP and related funding, the whole mechanism of widening participation agenda and the flexible pathway options provided by the universities.

It should also be noted here that the percentage of Indigenous students considering early departure have worsened since 2013 and as per the latest 2016 UES this stands at a severely dangerous level of 28% (QILT 2017). It is also interesting that in the same context, the international students who have a very large number from EALD backgrounds have the lowest threat of attrition at 14%. The pertinent question here is that if there could be a link between their pre-assessed English language requirements, well identified and wider English and academic language support and their personal

awareness about their English language proficiency, needs and challenges.

The most recent '*Factors Influencing University Student Satisfaction, Dropout and Academic Performance: An Australian Higher Education Equity Perspective*' (Li, & Carroll, 2017) is the latest in the genre that focuses on university experience, academic performance and attrition. Unfortunately, they remain an exercise in number crunching, perhaps because of the rigid boundaries set by the scope of these reports. Such reports remain statistical analysis and seem to lack a 'human touch'.

These reports have their purpose and place both in the academy as well in the domains of governance and public policy. However, there is no substitute for a quantitative, inclusive, respectful and humanely sensitive understanding of the real student experiences for the students who make it to the universities, and especially those who come from disadvantaged and marginalized groups, are fundamentally human beings.

The context of very complex Indigenous education has always been marred by systemically inflicted complications. The current surveys and assessments seem to have made some progress in appropriately zeroing in on Indigenous specific issues but they still leave a wider range of aspects untouched and indeed unnoticed. This could be seen as an extension of the invisibility of the impediments the Indigenous students face the invisibility as well of EALD Indigenous students as a linguistically diverse cohort (Koramannil, 2016). Given that there seems to be an increasing equality in terms of the university access, the participation and completion rates also need to be brought within similar parameters. This warrants some significant efforts and funding to understand the yet unknown and invisible factors that results in the significant letting down of the multi-disadvantaged Indigenous students where at present failure is guaranteed as much as their potential success. Only focussed and deliberate attempts to understand these veiled impediments will help later this awful equation.

Perhaps the acknowledgement and appreciation that higher education is fundamentally a human experience and it should not be restricted to mere numbers and rates would enable more sensitive inquisitions into the experiential aspect of learning at the universities. This is extremely critical for the most vulnerable sub-equity group of Indigenous students. Perhaps it is time to see them, talk and listen to them out. Perhaps it is time for every genuine researcher to learn to hear them and try to follow them to their real problems with consideration, empathy, and a respectful sensitivity. Only sensitive researchers with sensitive research can make genuine connections with sensitive human issues and only such genuine connections can pave the ways to connect problems with potential solutions.

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Metacognition and Problem Solving Strategies

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Metacognition

Metacognition is thinking about thinking. Although metacognition was recognized four centuries ago, it was emerged more in the studies of 20th century. Flavell (1976) describes metacognition as one's knowledge concerning one's own cognitive process and regulating one's own cognitive process with to help of this knowledge. According to Brown (1978), metacognition is an executive control, which can be seen as the control people have over their own cognitive process. Metacognition is generally defined as the activity of monitoring and controlling one's cognition (Young & Fry, 2008). It refers to higher-order mental process involved in using appropriate skills and strategies to solve a problem (Coutinho, 2007).

Metacognition is comprised of two components: knowledge about cognition (metacognitive knowledge) and regulation of cognition (metacognitive regulation) (Schraw & Dennison, 1994) (see Figure 1). There are three components of knowledge about cognition called: declarative knowledge, procedural knowledge, and conditional or strategic knowledge. Declarative knowledge was found to be what is known in a proportional skill or the assertions about the word and the knowledge of the influencing factors of human thinking (Deseote, Roeyers & Buysse, 2001). Procedural knowledge refers to knowledge about the execution of procedural skills (Schraw & Moshman, 1995). Conditional or strategic knowledge is considered to be which the awareness of the conditions that influence learning such as why strategies are appropriate (Deseote et al., 2001). Regulation of cognition, on the other hand, refers to activities that control one's thinking and learning such as planning, monitoring, comprehension, and evaluation (Schraw & Dennison, 1994). From Brown (1980)'s point of view, it can be seen as the voluntary control that people have over their own cognitive process. There are five components of regulation of cognition called: Planning, information management, monitoring, debugging, and evaluation. According to Schraw and Dennison (1994), planning refers to planning, goal setting, and allocating resources prior to learning; whereas, information management is skills and strategy sequences used on-line to process information more efficiently. Monitoring is assessment of cognitive processing plans (Efklides, 2009). Debugging is strategies used to correct comprehension and performance errors (Schraw & Dennison, 1994). Evaluation is self-judging of the answer and of the process of getting to this answer (Deseote et al., 2001). According to Kuhn

(2000), there would seem few more important accomplishments than people becoming aware of and reflective about their own thinking and able to monitor and manage the ways in which it is influenced by external sources, in both academic, work, and personal life settings. Metacognitive development is a construct that helps to frame this goal (Kuhn, 2000).

This study engages with the Brown (1978)'s framework of metacognition as the theoretical foundation since the Brown framework provides direct application to academic learning settings (Baker & Brown, 1984).

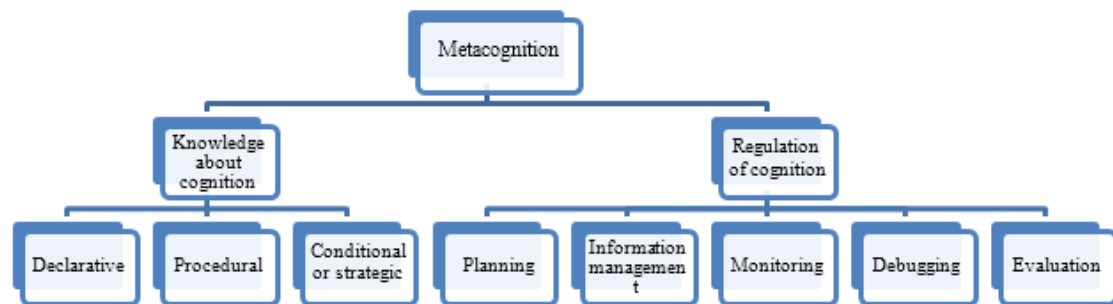


Figure 1. Components of Metacognition

Problem Solving

Problem solving is one of the most significant factors in the cognitive process. Problem-solving strategies play a central role in education because many tasks performed in professional and daily life require such strategies, which we define as planned sequences of activities leading to a goal, the solution of the problem (Taconis, Ferguson-Hessler & Broekkamp, 2001). Cause of problem solving involves the cognitive representation of prior experience and gives an overview of the students' plan of action in their cognitive process (Dhillon, 1998). The procedure in problem solving is to analyze the problem into the students' cognitive skills needed for solution (Mayer, 1998). According to Polya (1945), problem solving strategies consist of the following four major steps: description, planning, implementation, and checking (see Figure 2). Description is listing explicitly the given and desired information or drawing a diagram of solution. That is, it's a clear formulation of the problem. Planning is doing the basic relations and making outline for solving the problem. Implementation is executing the plan by doing calculations. Checking is controlling each of the steps as valid and if the final answer makes sense. In order to be successful in problem solving, students need to have ability to reflect upon, understand, and control their learning.

Gagne believed that "the central point of education is to teach people to think, to use their rational powers, to become better problem solvers" (1980, p. 85). Problem-solving plays a crucial role in the science curriculum and instruction in most countries, and is reported by many authors as a very difficult task for students (Mettes, Pilot, Roossink & Kramers-Pals, 1980).

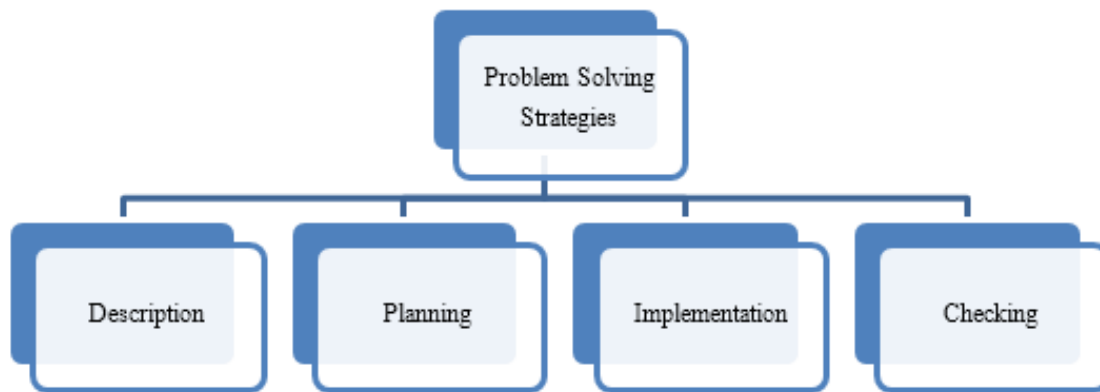


Figure 2. Components of Problem Solving Strategies
Metacognition and Problem Solving

Since metacognition refers to higher-order mental process involved in using appropriate skills and strategies to solve a problem (Coutinho, 2007), learners' metacognitive ability allows them solving of problems successfully (Eric & Mansoor, 2007). Several cognitive processes and metacognitive strategies are integral to problem representation and problem execution and underlie successful problem solving (Mayer, 1998).

Metacognitive training programs were found effective for problem-solving strategies regardless of learning aptitude or achievement (Delclos & Harrington, 1991). Swanson (1990) indicated that metacognitive skills helped children of lower aptitude compensate on problem-solving tasks. In addition, Sperling, Howard, Miller and Murphy (2002) showed significant correlations between children's metacognitive awareness and problem solving strategies.

Reviewing of the literature shows that research has examined a possible relationship between metacognition and problem solving strategies in diverse domains such as mathematics (Daniel, 2003; Desoete, Roeyers & Buyse, 2001; Eric & Mansoor, 2007; Montague, 1992; Rosenzweig, Krawec & Montague, 2011; Schonfeld, 1992), chemistry (Sandi-Urena, Cooper & Stevens, 2012; Rickey & Stacy, 2000; Tosun & Senocak, 2013), and history and physics (Meijer, Veenman & van Hout-Wolters, 2006). For example, Desoete, Roeyers and Buysee (2001) worked with 165 children in Grade 3 to determine the relationship between metacognition and mathematical problem solving. Relationship between metacognitive skills and mathematical problem solving was found in this study. Rosenzweig, Krawec and Montague (2011) studied metacognitive awareness in problem solving in mathematical education. In their study, participants were 73 eighth-grade middle school students in a large metropolitan school district in the southeastern United States. Results of this study suggested that when one did not discriminate between the types of metacognitive verbalizations, students across ability groups looked relatively equivalent in the quantity of verbalizations regardless of the problem difficulty. The aim of the research done by Tosun and Senocak (2013) was to reveal the

effects of Problem Based Learning (PBL) on the metacognitive awareness of chemistry teacher candidates with different academic backgrounds. The sample of the study was 70 first-year undergraduate students at a state university. Findings showed that PBL was more effective in developing metacognitive awareness levels of students with weak science background knowledge compared to those with strong science backgrounds. However, research looking for a significant correlation between metacognition and problem solving strategies in physics is not ample. Moreover, research examining students' metacognitive behaviors during solving of physics problems are needed.

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Telemedicine Technology Experience of Medical Institute of RUDN-University

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According to World Health Organization, Telemedicine delivers health care service where distance is a critical factor and professionals use Information and communication technologies (ICT) both for diagnosis and for continuing education. Telemedicine provides clinical support, overcome geographical barriers, uses of various types of ICT and its goal is to improve health outcomes.

Telemedicine has been evolving with technology for over a hundred years from telephone invention till modern mobile technologies. The idea of providing remote medical care arose more than 100 years ago. After invention of the telephone, people tried to transmit the sound of heart tone. At the end of 1950s video for remote demonstration of patients for medical students was transmitted. When active space exploration has began, the need for remote monitoring of the physiological parameters of astronauts has arose. In 1980s World Medical Association (WMA) produced documents (Regulations) on the use of computers in medicine. But real boom begin in the 1990s thanks to global Information Technologies and International programs.

Some advantages of telemedicine: for doctors it's a possibility of obtaining second opinion; for patients in remote regions it's a possibility to receive highly specialized medical care; for institution it's cost reduction and higher profit.

However, there are some barriers for implantation of telemedicine:

- Compatibility and standardization of technologies;
- Insufficiently developed regulatory framework;
- Data protection and privacy issues;
- Telemedicine services are often not covered by insurance;
- Patients are not ready to use telemedicine;
- Lack of qualified personnel.

For Russia distance is a really critical factor. From North to South it's 4000 km. And from East to West 10000 km. Regions on the Far East and Far North have small population

density and they need consultations of doctors who usually works in a big cities. For example for medical examination of people of the Arctic zone temporary centers which use satellite channel for consulting with leading specialists are installed.



Figure 1. Business Game on Telemedicine

Especially for remote areas of Siberia, Far East, Far North and Zabaykalye mobile consultancy and diagnostic centers were created. It's so called "Health trains". Trains are modern equipment with X-rays, ultrasound, endoscopy rooms. Also trains include telemedicine room with a Satellite Communication System to produce videoconferences with leading specialists.



Figure 2. Wireless Transmission of Ophtalmological Operation

In 1997 in frame of project "Moscow to the Russian regions" the first remote interactive lecture was organized, during this lecture doctor-cosmonaut Oleg Yurievich Atkov had conversated with doctors in real time. Now we use videoconference in medical education: we've organized telelectures with interactive communication between the lectors and remote audience.

In 2015 our department of medical informatics and telemedicine developed new Curriculum module "Telemedicine" for students of 4th and 5th years. It takes 36 hours

(one credit). Main professional competence that is formed is the ability to use modern management methods to solve Medical Diagnostic problems. Some topics, that are included:

- the fundamentals of telemedicine,
- the world trends in its development;
- technological equipment of telemedicine events;
- hardware and software of telemedicine;
- economic and legal aspects of telemedicine;
- scenarios of telemedicine activities

For practical skills in our course we've included business games, for example, remote consultant doctor-doctor, remote mentoring during operations or diagnostic procedure. We demonstrate to students masterclasses from leading clinics of Russia, Europe, India, Brazil and Canada. During three years we have thought about 2000 students from different countries.

Also we have two distant programs for practitioners – “Telemedicine technologies in healthcare Practice” and “Telemedicine in the Healthcare System” - first one gives basic knowledge and another one advanced set like tele-radiology. We involve specialists from different countries for holding interactive master-classes with online broadcasting of surgery procedures. Ability to see operation “by the eyes of the surgeon” is the essence of interactive master-classes on basis of videoconferences. Russian scientists have developed hardware-software unit for wireless transmission and processing of three-dimensional visualization of the ophthalmological operation and they have several scientific patents.

Our telemedicine center is equipped with all modern ITU standards for video conferencing, HD camcorder, professional document camera, built-in illumination plate for displaying X-rays.

Teaching approach allows to obtain theoretical knowledge and practical skills of videoconferencing and distance education.

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Teacher Leadership for the Twenty First Century: The Power of Collaboration

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Across different societies in the knowledge era, it is imperative to prepare the future citizens to the twenty-first century's ever ending change. Due to the shifting paradigm in the teacher's role where teachers are required to work in teams, teacher collaboration has received more attention from scholars (Lima, 1998; Wenger & Wegner-Trayner, 2007). Collaboration is a widely used term nearly in every aspect of life. Morse (2000) argues that collaboration is an educational reform imperative: "Educators will recognize they are not alone in searching for new modes of human exchange. The fact is, this quest for a new way of human exchange is endemic in the social order...Rejecting collaboration is not an option" (p. xi).

Collaboration in education appears, however, among education scholars in various forms, such as teacher teams (Bryk, 2010; Lester & Evans, 2009), teacher communities (Chan & Fai Pang, 2006; McLaughlin & Talbert, 2006), social network in teaching (Lima, 2005, 2010), community of practice (Wenger & Wegner-Trayner, 2007), professional learning communities (Brook, Sawyer & Rimm-Kaufman, 2007; DeMatthews, 2014; Vescio, Ross & Adams, 2008), enhanced collegiality and collaboration (Goddard, Goddard & Tschannen-Moran, 2007), culture of professional collaboration (Hargreaves & O'Connor, 2017) and more.

In the knowledge society teachers are required to work together cooperatively and take more responsibility on their teaching. Since professional teachers cannot avoid working together in teams, they need, however, a set of values, principles, and some common goals to achieve. In essence, working together, requires more than just to meet, it needs commitment, willingness to share and compromise, true collaboration, and leadership. For the twenty first century skills, the literature remarkably address five key components: critical thinking, creativity, motivation, metacognition, and collaboration (Lai & Viering, 2012).

For this chapter, collaboration is being highlighted as an important factor in teachers' work and professional development. I will first define the term collaboration and discuss its importance in teacher leadership in the modern age of shared knowledge, and then present its advantages and barriers in professional collaborative communities. In the final part of this chapter, I will briefly elaborate on ways to foster collaborations among professionals and teachers in educational organizations.

What is Collaboration

Collaboration is quite complex and seems there is no one single definition that is fully comprehensive enough to describe what the term “collaboration” is. As Lima (2001) points out, ‘despite the important work that has been developed over the last two decades, there is still wide controversy about exactly what teacher collaboration is’ (p. 98). There is, however, common ground to the various definitions suggest that collaboration is fundamental to deep, true and effective leadership, teaching and learning.

Roschelle and Teasley (1995) define collaboration as a “coordinated, synchronous activity that is the result of a continued attempt to construct and maintain a shared conception of a problem” (p. 70). They define the shared problem as a shared knowledge structure that supports problem-solving by integrating goals, descriptions of the current problem state, and awareness of potential strategies, as well as the links between them. Roschelle and Teasley explain that collaboration takes place within this joint problem space, which provides the structure needed to allow for meaningful conversations about the problem being targeted. To create a joint problem space, partners should be able to introduce and accept knowledge among them, monitor exchanges for evidence of divergent meanings, and repair any divergences identified.

Kayser (2014) defines collaboration as: a joint effort between two or more people, free from hidden agendas, to produce an output in response to a common goal or shared priority. Often this output is greater than what any of the individuals could have produced working alone. From the perspective of organizational theory, Bolman and Deal (2003) describe collaboration as a form of mutual coordination and sharing that can enhance organizational performance by fostering “creativity and integration around specific problems” (Bolman & Deal, 2003, p.55).

Goss and Hunter (2015) contend that “collaborative professional practice has a clear moral purpose: to increase student learning. It creates a culture of improvement, underpinned by a shared commitment to, and understanding of, high quality teaching practice. A common language of learning standards and progress enables teachers to work together to challenge and support each other, and track student progress over time (p. 41)”.

Scholars tend to describe collaboration within different types of contexts. Poulos, Culberston, Piazza and D’Entremont (2014) describe collaboration within the term “effective teacher collaboration”. It is defined as “engaging in regular routines where teachers communicate about classroom experiences in an effort to strengthen pedagogical expertise⁵ and push colleagues to try new things” p. (8).

There is a variety of approaches, both formal and informal, in which collaboration can take place in professional communities, especially at schools. A school principal may construct a team of teachers to solve academic issues in the school, or form teams of special education and general education teachers working together in co-teaching within the school system. Others may view collaborative as a form of strategic planning for the entire school or between schools within one specific district (Friend & Cook, 2000).

Collaboration creates a community working to achieve a common goal through the sharing of practice, knowledge and problems (Brook et. al., 2007). Collaboration involves a joint effort to create something new in support of a shared vision. Fullan and Quinn (2016) indicate that collaboration requires some fundamental key components, including joint effort, creating something new, and sharing a common vision. They contend, it is “not about creating a place where people feel good but rather about cultivating the expertise of everyone to be focused on a collective purpose” (Fullan & Quinn, 2016, p. 48).

Effective collaboration encourages ongoing observation and feedback among colleagues where a culture of professional sharing, dialogue, experimentation and critique becomes commonplace. Collaboration can encompass a range of activities, from teachers working together in an informal, unplanned way to the implementation of more formal collaborative approaches, such as professional learning communities (PLCs). Effective collaboration is frequent and ongoing and, when most successful, an integral part of daily routines. Schools that effectively collaborate “create a base of pedagogical knowledge that is distributed among teachers within a school as opposed to being held by individual teachers” (Brook et al 2007).

These findings by Brook and colleagues (2007) resonate with a synthesis conducted by Stoll, Bolam, McMahon, Wallace and Thomas (2006). Stoll et al. (2006) draw upon five features that operate simultaneously: (a) shared values that emphasize a focus on student learning; (b) shared responsibility for student learning that assist to maintain commitment and put collegial pressure on colleagues to engage, learn, and improve; (c) reflective professional inquiry that manifests through conversations about vital issues, the application of new knowledge, and the identification of solutions to support students and their needs; (d) collaboration that moves beyond superficial interactions of help, support, or assistance; and (e) an emphasis on group and individual learning where teachers develop as professionals, but also sustain a vision toward inquiry and its benefits for improving their own practice in their own school (Stoll et al., 2006).

Little (1990) distinguished four different types of collaboration situated on a continuum ranging from independence to interdependence and include: storytelling and scanning

for ideas, aid and assistance, sharing, and joint work. An important characteristic of collaboration appeared to be its task-related focus, including working and reflecting together for job-related purposes (in James, 2007). In the case of collaboration, this working together includes the partners in the process doing all their work together as opposed to cooperation in which partners split the work and combine each of their partial results into the final outcomes (Sawyer, 2006).

James (2007) developed a model for collaboration and described it as “collaborative practice”. In this model James (2007) divided collaborative practice into three essential components: a) collaboration, b) reflective practice, and c) a focus on the primary task. James (2007) argues that all three components are imperative and important. The first component (collaboration) defines “what is to be done now”, the second component (reflective practice) defines “what is to be done to improve the future work”. Reflective practice and collaboration without a focus on the primary task as stated by James (2007) may result in avoiding the focus on the primary task. Whereas, collaboration and a focus on the primary task without considering reflective practice may lead to dealing with unimportant and not improving collective practice. Finally, James (2007) argues that initiating reflective practice and a focus on the primary task without the collaboration would result in the scope and capacity for reflection being limited.

Collaboration, has been used interchangeably with another term, cooperation. Although, both terms resonate with shared work between two parties or more, they do not, however, hold the exact meaning and outcomes. Therefore, it is important to briefly highlight the difference between the two terms.

Collaborative vs. Co-Operative

Panitz (1999) defined the terms as: Cooperation is a structure of interaction designed to facilitate the accomplishment of a specific end product or goal through people working together in groups; Collaboration is a philosophy of interaction and personal lifestyle where individuals are responsible for their actions, including learning and respect the abilities and contributions of their peers (p. 3).

Although there is no universal agreement among scholars on accepted definition of the two terms, the commonalities between the two terms are greater than the differences. Kirschner (2001) described some common components between cooperative and collaborative learning:

- Learning takes place in an active mode; the teacher is more of a facilitator than a “sage on the stage”; Teaching and learning are shared experiences between teachers and students; Students participate in small-group activities; Students must take responsibility for learning; Discussing and articulating one’s ideas in a small

group setting enhances the ability to reflect on his or her own assumptions and thought processes; Students develop social and team skills through the give-and-take of consensus- building; Students profit from belonging to a small supportive academic community (p. 4).

Why Collaboration Matters

In the past, teachers were 'isolated' in the way they operate with groups of students in individual classrooms. This whole paradigm has dramatically shifted in the 21st century. Individual schools cannot anymore continue to operate in isolation, competing for resources, staff, and students. Fullan (2013) and Hargreaves and Fullan (2012) argue that education into the future must be fundamentally more collaborative at every level. The current practices of pedagogy lack behind and demands that teachers join forces and work in collaboration to achieve better outcomes. Sharratt and Planche (2016) argue that collaboration is a powerful way to deepen teachers' capacity, to increase the total value of the professional capital in the school, and to harness the power of the collective.

In the recent years, western and modern countries are spending more time, money, and resources than ever before on education to bridge the gap between the traditional teaching system and the technology era (Fullan & Langworthy, 2014). According to surveys in the USA about 59% of adults between 18 and 35 years of age have reported that they acquired most of their job skills beyond what they have learned at school. In another study conducted by Gallup 43% of fifth to 12th grade students expressed their desire to establish their own business one day, but only seven per cent claimed they had any relevant education that would fulfill their dreams (Fullan & Langworthy, 2014). This, as claimed by Fullan and Langworthy (2014) due to old pedagogies practices where "a teacher's quality was assessed primarily in terms of their ability to deliver content in their area of specialization" (p. 2). In contrast, the new pedagogy approach depends on the teacher's pedagogical capacity and in their ability to form partnerships with students and this of course require partnerships with other team members. This demonstrates the urgent need for new paradigms in teaching and learning. The call for learning and teaching communities, is one model that has been highly embraced by scholars (Hattie, 2016). Collaboration between professionals can lead the way to the 21st century skills.

Advantages and Challenges of Collaboration

There is an immense body of work that address the benefits of professional collaboration (Hattie, 2015; Jackson, 2009; Skerrett, 2010; Levine and Marcus, 2010; Little, 2003; Imants, 2003). These findings, however, suggest that a community is a promising environment in which ongoing collaboration between teachers is stimulated. Stoll,

Bolam, McMahon, Wallace, & Thomas (2006) reviewed 55 studies on the effectiveness of communities of teachers and that there is growing evidence that supports the impact of communities on teachers' professional development. Hattie (2015) argues that purposeful, supportive collaboration extends teacher practice to heights impossible to scale alone. In collaborating with purpose teachers can reflect on their current practice to identify both strengths and areas for improvement, share their strengths with their peers, and collaboratively design more chances for improvement. Further, according to Hattie (2015) in collaboration teachers create a unit of work to develop deep learning experiences, common assessment tasks, and a consistent approach to moderating student work. Furthermore, purposeful collaboration allow teachers to gather evidence from several classrooms, including through peer observation, about how a particular subject is currently taught.

Earp (2018) suggests that "collaboration can lead to more authentic engagement of teachers, a greater sense of belonging among staff, and a way of working where teachers feel able to challenge each other to keep improving their professional practice" (p. 1). Barger-Anderson, Isherwood and Merhaut (2013) proposed six key advantages that assisted teachers and students to succeed in supportive collaborative experience in schools. The benefits are: (a) better instruction through a system of support which provided them with new ideas, (b) expanded teaching tool kit through a system of accessible resources and the promotion (c) lesson consistency, where teachers agree that they are on the same page due to their co-planning and delivering instruction (d) more inclusive teaching methods where all learners from different ability and background can learn together, (e) increased students' effort where academic rigor has been met, and (f) higher teacher responsibility through a sense of teacher accountability for promoting students success and achieving the learning long term goals.

James (2007) suggests that collaboration has an impact on three areas: (a) it "widens opportunities for enhanced reflection in relation to the primary task through dialogue and discussion with others; (b) it provides practice and cultural norms, shaped by the primary task and frame reflection in and on action; and (c) enhances the collective expertise and other resources for work on the primary task. Collaboration, however, benefits not only professionals working together, but also the learners (see Bolman & Deal, 2003; Bryk, Sebring, Allensworth, Easton & Luppescu, 2010; Goss & Hunter, 2015; McLaughlin & Talbert, 2006; McPartland, 2011).

In collaboration environment, students develop positive attitudes toward learning, higher level of thinking skills and problem solving, and it creates an environment of active, involved, exploratory learning (Chatterjee, 2015). Further, in collaborative context, students learn self-management skills, become more responsible for their own

learning, and they practice leadership skills (Lai & Viering, 2012). At the social level, collaboration facilitates students' social interaction, a stronger social support exchange, and students' responsibility for each other (Blatchford, Kutnick, Baines & Galton, 2003; Sharratt & Planche, 2016). Emotionally, when professionals collaborate with each other, they reduce classroom and learning anxiety, especially when the learning skills is gradually becoming complex (Eccles & Wigfield, 2002; Eisenberg, 2010).

Goddard et al., (2007) constructed a collaboration scale to examine the extent to which collaboration affect the learning outcomes of fourth graders in 52 elementary schools in mathematics and reading. The five category scale concerned with the following areas:

1. Planning school improvement
2. Selecting instructional methods and activities
3. Evaluating curriculum and programs
4. Determining professional development needs and goals
5. Planning professional development activities (Goddard et. al., 2007).

The researchers concluded that schools with higher level of collaboration have yielded greater level of student learning achievement.

Although, collaboration between professionals has been endorsed by most researchers (Nevin, Thousand & Villa, 2007, 2009), there are however, some challenges that hinder the ability to produce effective collaboration (Hargreaves, 1994). York-Barr, Ghore and Sommerness (2007) reported that collaboration shortages come in the form of differing "philosophies," which was the term often used to describe differences between teachers related to orientations or beliefs about instruction and professional practice."(p. 318). Some teachers feel insecure because teaching become public and teachers are requested to work with more diverse students than they used to in the past. Further, teachers become more confused because of the role shifting as to what they should teach and to whom. Furthermore, collaboration between teachers may decrease flexibility and creativity due to the presence of another partner in the classroom (York-Barr, Ghore & Sommerness, 2007).

Stoll et al. (2006) in agreement York-Barr et al. (2007) pointed out a number of factors that hinder the construction of effective professional collaboration, including: individual orientations to change, group dynamics, and school context (i.e., school size, phase of school reform, school age and history, group dynamics, and existing professional learning infrastructure). The researchers added that schools that are larger tend to present numerous barriers to change, including a greater diversity of teachers and

students, and lack of organizational inertia for change. Hargreaves (1994) reported that teachers in two districts that were under study in Canada used their planning time to point to how some kind of collaboration that were forced, imposed and artificial, could be harmful and laid to reduce teachers' motivation to engage in collaboration themselves.

Fostering collaboration among professionals

Collaboration needs more than just a sharing work among professionals. Scholars have laid the ground for best practices for effective teacher collaboration. Internationally, educational reforms call for an "increase in collective action between teachers include collective teaching, development of comprehensive lesson plans, coherence between subject materials, and distributed decision making" (Main & Bryer, 2005). Vescio and colleagues (2008) argue that community should be seen as a way to embed teacher collaboration into the culture of the school. This approach may assure that the collaboration will not be seen as merely an exchange between teachers. Rather, collaboration will become inclusive, genuine, and ongoing.

According to Gensen (2014) collaboration requires improvement in allocating quality time for teachers to work together by cutting back on things that teachers do that don't directly improve teaching, allow teacher to do things that they are accustomed to do more efficiently, and finding resources within their broader school budget to hire more teachers. Further, Gensen (2014) suggests that school administrators should be able to allocate time for professional learning within the curriculum timeframe by setting the right priorities. In several studies conducted around the world, it has been documented that school systems that construct teacher mentoring programs heavily invest in teacher training. For example, Shanghai has intensive mentoring program that assures quality teaching and teacher community collaboration. The Shanghai mentoring programs target not only novice teachers, but also veteran teachers are enrolled in such programs (Smith & Ingersoll, 2004).

In a thorough study conducted by Brouwer (2011) based on literature review documented on professional collaborative communities, the author proposed a set of intervention types to foster collaboration. Among those intervention elements are the following: a) determine shared goals and visions of the organization, b) map individual goals which lead the way for clear communication, c) develop norms and routines agreed upon the community of teachers, d) developing guidelines to deal with conflict and decision making, e) make agreement on non-functional behavior of the learners throughout the different indoor and outdoor activities, f) organize leadership roles among teachers who will take responsibility of a previously agreed upon tasks, g) share leadership to make way for authentic collaboration and accountability, h) stimulate reflection and

feedback among the team members, i) develop trust within the community of teachers, j) enable a positive atmosphere of caring for each other, and k) promote collaboration among colleagues.

To conclude, collaboration is complex, perceived by different organizations in different ways, takes time and sincere effort, demands commitments, builds upon mutual trust among professionals, and value shared and distributed leadership. True collaboration is possible among professionals. Teachers and professionals in any given organization can succeed when careful planning, allocated quality time, shared values with one goal in mind, improving students learning achievement have been set forward.

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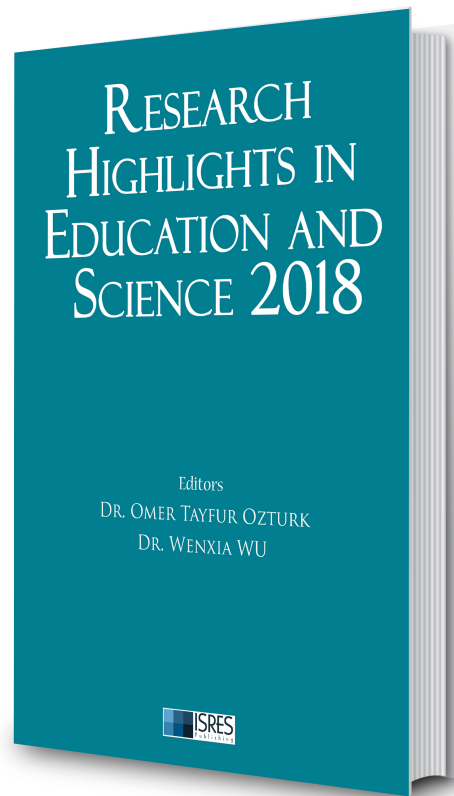
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