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Research Article

Self-directed learning development for high school students and teaching issues

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Abstract: The goal of this paper is to provide an implementation setting applying our method which uses the combination of cognitive capacity, personality classification and dependability criteria. The study pointed that, Differentiated teaching is a measure that needs a long and consistent implementation throughout the learning process. This measure is suitable for gifted class environments where it is necessary to allocate students into groups of equal ability to focus on fostering students' learning ability. However, this measure can also be applied to mixed groups of students with different self-study abilities by assigning students to perform collective tasks so that each student can support each other and progress throughout the course.

Keywords: Differentiated teaching, Informatics teaching, self-directed learning capacity.

1. Introduction

As a transformation in society and schools evolves, effective teachers in contemporary classrooms will have to learn to develop classroom routines that attend to, rather than ignore, learner variance in readiness, interest, and learning profile. Such routines may be referred to as "differentiating" curriculum and instruction. Differentiation is a pedagogical, rather than an organizational, approach (Stradling & Saunders, 1993). One way of conceiving differentiation is modification of teaching and learning routines to address a broad range of learners' readiness levels, interests, and modes of learning (Tomlinson, 1999, 2001). Differentiation can be defined as an approach to teaching in which teachers proactively modify curricula, teaching methods, resources, learning activities, and student products to address the diverse needs of individual students and small groups of students to maximize the learning opportunity for each student in a classroom (Bearne, 1996; Tomlinson, 1999). Differentiated teaching is a fundamental pedagogy including constructive instructions adapted to what students already know

The rest of the paper is organized as follows. After introducing a state-of-the-art differentiated teaching method in the literature Section 2, we present our procedure which includes 3 steps to develop students' SDL capacity on Informatics in Section 3. In Section 4, we describe our setting implementation recommend in which, we use the combination of different criteria to divide students into groups. Finally, we conclude this paper in Section 5.

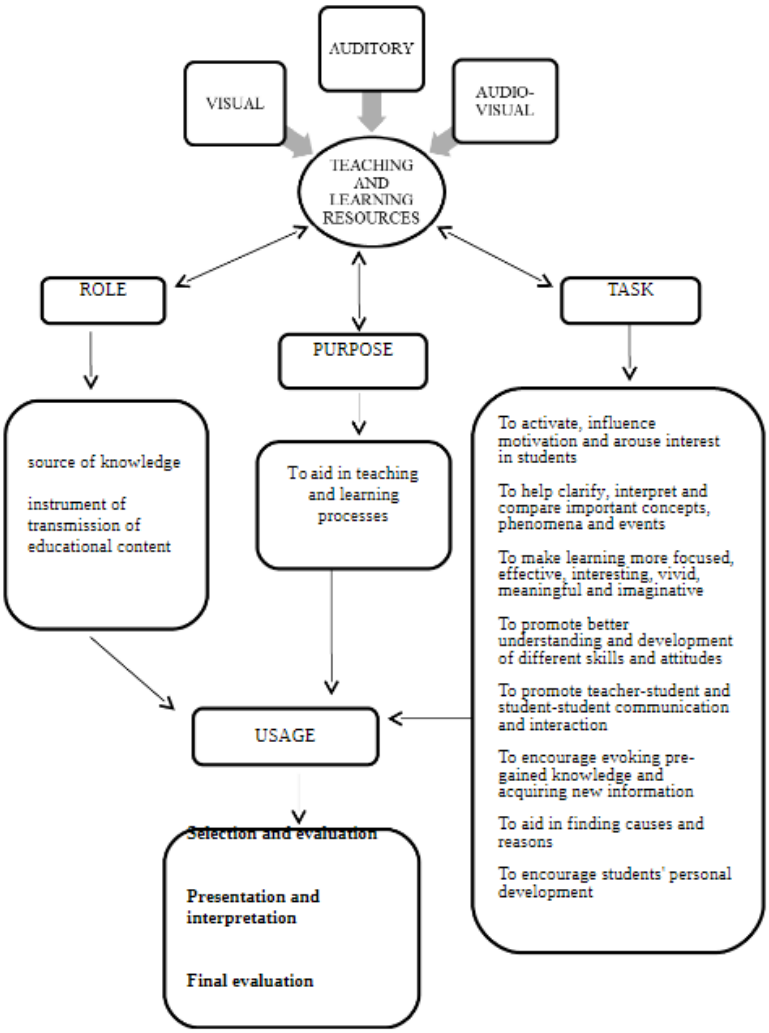
2. Literature Review

2.1. Differentiated teaching

Differentiated teaching is therefore responsive teaching rather than 'one size fits all teaching', consequently starting where the learners are and reaching the capacity of each learner by bridging the gaps in understanding (Cox, 2008).

Below figure :

Figure 1- Teaching sources, roles and types (Buljesta, 2013)



2.2. Criteria to differentiate students in the learning process

To divide learners into groups with different features, one needs to take into account criteria to identify goals, needs and tasks of each individual. In this section, we review 5 main factors that educators use to classify students in differentiated teaching.

When teachers have attempted differentiation, it has often been used in ways that are limited and ineffective (Schumm et al., 1995; Stradling & Saunders, 1993). Modifications are likely to be improvisational or reactive, rather than preplanned or proactive (Hootstein, 1998; McIntosh, Vaughn, Schumm, Haager, & Lee, 1994; Schumm & Vaughn, 1992, 1995; Tomlinson, 1995). Teachers seem particularly resistant to adapting or modifying materials, planning lessons for individuals, and changing evaluation procedures (Johnsen, Haensly, Ryser, & Ford, 2002; Schumm & Vaughn, 1995; Vaughn & Schumm, 1994). Appropriate response to learner variance is also impeded by instruction in which understanding is sacrificed to coverage and where teachers have not identified key concepts, ideas, and skills that would serve as a solid framework for modifications (Schumm & Vaughn, 1995; Tomlinson, Callahan, Tomchin, et al., 1997; Vaughn & Schumm, 1994).

3. The proposed process of guiding students to self-study

These sorts of shortfalls are evident whether students' differences result from learning problems, advanced learning, second language, or cultural variance. For example, while teachers appear willing to accept learners with mild disabilities into their classrooms, treating them fairly and impartially (McIntosh et al., 1994; Schumm & Vaughn, 1995), adjustments teachers make for these students amount to little more than providing reinforcement and establishing rapport with the students (Schumm & Vaughn, 1991)—or reducing expectations (Deno, 1994; Fuchs & Fuchs, 1998). Teachers are unlikely to accept strategies that require them to modify materials, change instructional practices, make longrange plans, or adapt scoring and grading criteria (McIntosh et al.). The students are included in whole-class activities, but participate only to a very limited degree. The students do not receive what could be called meaningfully differentiated instruction (McIntosh et al.). Similarly, both survey (Archambault et al., 1993) and observational (Westberg, Archambault, Dobyns, & Salvin, 1993) studies of students identified as gifted suggest that teachers made only minor modifications in their curriculum or instruction to address the advanced learning needs of these learners in the regular classroom. In fact, gifted students received no differentiation in 84% of the learning activities in which they engaged (Reis et al., 1993).

3.2. Student self-study in the direction of differentiation

Identify learning needs → Identify learning goals → Identify learning resources

Define a learning strategy → Assess learning outcomes

Pusparini (2020) mentioned Teacher needs to provide a tool or media to make students able to grasp materials easily, express ideas freely, and participate actively in class discussion, and learning journal could be an alternative to achieve those purposes. This paper will discuss of how learning journal can help students grasp the course content and how students respond toward the implementation of the journal in learning process. It is a descriptive research-forms. The results of the research show that students engaged actively in classroom discussion. They also considered that journal help them to prepare the materials being discussed, so they could express their opinions well. However, the feedback of the teacher was still needed for it did not draw attention on the language errors only, he could focus more attention on the course content, especially to ensure that students had found the answers of their questions.
Beside, Learning is a kind of process to know or understand something (Farrel & Goerge, 2010). By writing learning journal on every meeting and getting teacher's feedback on every journal
they submitted, students who made a short summary before were able to write a better one for another topic.
As a result, they were also able to pose good questions that showed they were able to analyze the content well.

3.3. Implementation, evaluate result and adjust

After having plans to guide students in self-study, teachers can support them in each component capacity, assign learning tasks for students to learn on their own, and encourage them to learn on their own. The table below is the criteria and their manifestation we use in teaching the module Graphic Software, of the Informatics program grade 11^{th}.

Criteria to estimate the SDL capacity of student on Graphic Software teaching

First, Identify learning goals

Second, Identify learning task

Third, Identify learning resources

Fourth, Identify learning strategy

Fifth, Assessment

Sapan and Mede 920210 showed Differentiated Instruction (DI), as a single instructional technique that focuses on the challenges of meeting varied needs and qualities of learners in inclusive educational contexts, has recently attracted great attention in the field of education. The present study aims to explore the effects of differentiated instruction (DI) on foreign language achievement (FLA), foreign language motivation (FLM), and learner autonomy (LA) of English learners at a state school in Istanbul, Turkey. Additionally, the study attempts to explore how students and their teacher perceive the use of DI in English classrooms as well. The participants were 24 students and one teacher enrolled in the 8th grade (secondary level) English program at a state school in Istanbul, Turkey. The data were collected quantitatively using the Foreign Language Motivation Questionnaire, pre-and post-achievement tests, and the Learner Autonomy Scale. To complement the quantitative data, qualitative data were gathered from student interviews and teacher reflective journals. The findings demonstrated that incorporating DI enhanced the participants' overall FLA as well as FLM and LA. Both students and their teacher perceived DI to be effective and useful while studying and teaching English. Based on the obtained findings, the study provides suggestions and pedagogical implications about incorporating DI in secondary-level English classrooms

4. The proposed implementation of the differentiated teaching method

In this implementation, we suggest to combine the cognitive criteria, personality criteria and student's learning style to classify students into groups. More precise, Table 3 describe the used criteria in details, and groups of student are described in Table 4.

Table 3. Criteria in proposed method

Diffirentiate Criteria	Classification
Cognitive Capacity	Students merely know the knowledge.
	Students understand the knowledge.
	Students are able to apply the knowledge to do exercises and solve problems in real life.
	Students are able to evaluate, analyse and create, on the basis of taught knowledge.
Personality	Introvert
	Extravert
Learning style	Independent
	Dependent.

The combination of 3 criteria leads to 16 groups, as described in Table 4 below:

Table 4. Groups of students

Group	Classification
KII	Know the knowledge/Introvert/Independent
KID	Know the knowledge / Introvert /Dependent
KEI	Know the knowledge /Extravert/Independent
KED	Know the knowledge /Extravert/Dependent
UII	Understand the knowledge/Introvert/Independent
UID	Understand the knowledge /Introvert/Dependent

UEI	Understand the knowledge /Extravert/Independent
UED	Understand the knowledge /Extravert/Dependent
AII	Be able to apply the knowledge/ Introvert/Independent
AID	Be able to apply the knowledge / Introvert/Dependent
AEI	Be able to apply the knowledge / Extravert/Independent
AED	Be able to apply the knowledge / Extravert/Dependent
EcaII	Be able to evaluate, analyse and create/Introvert/Independent
EcaID	Be able to evaluate, analyse and create /Introvert/Dependent
EcaEI	Be able to evaluate, analyse and create /Extravert/Independent
EcaED	Be able to evaluate, analyse and create /Extravert/Dependent

In reality, the proposed diffirentiate teaching method is not straightforward with the educators. It requires much conciousness, passion and time from teachers to observe all the behavioral expression of their students to label them to appropriate groups. Only by a proper labelling process, relevents and suitable lessons could be provided to each group. In addition, educators need to be flexible in asigning tasks and exercises to students, not just stick to the personality classifications and learning styles. Part of the reason is that one important purpose of education is to provide a comprehensive development to the learners, avoid students from being imprisoned by their possessed knowledge and skills. As consequence, educators should be encoraged to push students to challenging missions, which may help them to discover and develop domains and skills they don't know before via their own SDL capacity.

5. Conclusion

For high performance in Informatics teaching, an appropriate differentiated teaching must be applied Vietnamese students with differences situations and circumstances, as mentioned in VGEC. This paper addresses criteria to classify students into group on the basis of their cognitive capacity, psychological personality, types of learner, cognitive style and intellectual ability. We introduce a novel procedure which guide students develop their SDL capacity in Informatics within 3 steps.

Differentiated teaching is a measure that needs a long and consistent implementation throughout the learning process. This measure is suitable for gifted class environments where it is necessary to allocate students into groups of equal ability to focus on fostering students' learning ability. However, this measure can also be applied to mixed groups of students with different self-study abilities by assigning students to perform collective tasks so that each student can support each other and progress throughout the course.

Apart from motivating students during the learning process, enhancing their independence and interest in learning is another vital goal to be attained in language classrooms. It has been suggested that making the learning environment more challenging and interesting as well as providing several different learning choices makes learners feel more responsible for their learning (Clapper, 2010). When students take the responsibility for their learning, which means more student-centered lessons, their motivation, interest, and autonomy also increase (Betts, 2004; Sanacore, 2008). Fundamentally, it is intended to improve learner autonomy, and this is achieved by enabling the students to take responsibility for their learning through clear explanations of the goals, providing a learning environment with different learning styles, materials, and activities. Likewise, presenting different ways of learning and making contributions to content, process, as well as assessment, help learners become more autonomous. Thus, differentiating the learning process and medium for students provides them with the opportunities to enhance their autonomy (Convery & Coyle, 1993).

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