Teachers for the Knowledge Society

When learning and assessment become meaningful: students get involved in interdisciplinary project-work

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Abstract

This paper presents the results of a series of projects that are focused on the use of multiple representations in interpreting literary texts. The target group consisted of students in the lower secondary. Within this research, the core for multiple representations was given by an operational concept in the mother tongue curriculum while the competences to be trained were selected from various school subjects: Romanian, History, Geography, Art, Music, Civics, Technology, Physics and Mathematics. The results were analysed and the data confirmed that when using multiple representations students get to a deeper understanding in both literature and other subjects.

Keywords: interdisciplinarity; multiple intelligences; multiple representations; operational concept; self assessment; deep understanding.

1. Teacher and... student

The idea of designing interdisciplinary projects has been inspired by a master program I attended at the Faculty of Letters in Bucharest, Romania. As a graduate student, I had the opportunity to explore the modern theories of learning and I experienced multi-representational tasks as well as individualized approaches. Our professors have never imposed their solutions but encouraged and supported us to find our own. There were no recipes but a permanent feedback towards the adaptation of the theories to the specific contexts of learning at the university and in our schools. This is how I started to internalize what had previously been just a bulk of theoretical knowledge which I viewed as difficult and not applicable. I gradually understood that this is the reality of my own learning and it could become the core of my teaching. With that in mind, I started to attentively monitor my classes and, after weeks of observation and reflection I came to understand that the multiple representations may be a key to motivate children in order to learn and to get deep understanding within various school subjects (Singer&Sarivan, 2005).

My research was inspired by a number of key concepts in the studies of Piaget, Vygotsky, Bruner, Gardner which I interpreted from the point of view of both my learning experiences and teaching practice. The features of the operational stages (Piaget, 1999) made me reconsider a number of teaching habits that were inadequate for the students’ development. We commonly flood our students with lots of academic information and disregard that children have different explanations of reality according to their stage of cognitive development. Educators must take into account the stage of their learners’ development and should not ask students to solve tasks far beyond their

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Keywords: interdisciplinarity; multiple intelligences; multiple representations; operational concept; self assessment; deep understanding.
cognitive abilities. Vygotsky’s intellectual tools that emerge from culture to adapt to culture (1980) made me reconsider a lot of the teaching practices in the mother tongue that are obsolete for nowadays needs of communication. Influenced by the writings of Vîgotsky, J. Bruner believes that learning is an active process. Learners "construct" ideas or concepts based on what they already know (Bruner, 1983). Like the Russian theorist, he emphasizes social factors and the cultural context. In his view, the constructivist teacher must help students become active participants in learning by designing activities to transform the classroom into a laboratory which generate knowledge. By deconstructing and reconstructing aspects of the above-mentioned theories (which converge at points related to the general constructivist vision), H. Gardner created an original theory of learning (2004, 2006), which is centered around a subject that is valued for his individual profile and the potential of which can be adapted to a certain socio-professional niche.

As the cognitive and constructivist paradigm evolved into the field of education so did my personal interpretation of a possible combination of tendencies that could improve my students’ learning. In this perspective I first tried one multiple-representation-based project, and then another one. The good results made me design a series of such projects, each being focused on a specific concept from the mother tongue curriculum and “spiced” with examples and metaphors from other school subjects the students study. In each project the mother tongue notion is a new one as new are the connections with other subjects and the complementary concepts and competences from other domains that come into the blend.

2. A student-centered selection of methodology

The interdisciplinary project-work is structured as an ongoing action research in which several instruments are used (questionnaires, observation grids, feedback and self-assessment sheets) and they are all adapted to the students’ needs of cognitive and metacognitive development. We have for instance initial as well as final assessment which is performed via a “self-portrait” questionnaire. Students are encouraged to describe themselves from a point of view which is suggested by me and is connected to the operational concept from the mother tongue curriculum we attempt to understand beyond facts and memorization. There is also a monitoring chart I use in order to mark their progress in accordance to the competences that were selected to being consolidated on each occasion.

The research as such is planned in clusters, each cluster representing a learning unit in which the students develop and assess their projects. The focus of the unit is a mother tongue operational concept that offers a specific context for the exploration of the text. The students approach the concept and the text by making use of entry points and analogies from other school subjects.

The planning is complex and comprises the following steps: the selection of the mother tongue conceptual lens; the selection of the mother tongue competences that are to be focused; the identification of operational concepts, competences or values and attitudes in the curricula of various subjects that the students learn and which can become powerful analogies or interesting entry points (Gardner, 2004); the development of a conceptual network so that everything is well connected and harmonized before the project recommendations are made; the design of the project and its stages; the discussion with the students about the terms of reference, the choice of products and the assessment criteria. The whole planning of the project involves the students in all the major decisions concerning the work so that ownership and responsibility are accepted from the very beginning. The table below (Table 1) briefly highlights six projects that were developed within three different groups of lower secondary students. The columns try to connect the conceptual lens (operational concept from the mother tongue curriculum), the nature of the blend (school subjects, topics, procedures that are involved in the interdisciplinary approach) and the exploratory routes that were suggested. The first column is devoted to the group’s profile.
<table>
<thead>
<tr>
<th>Nr</th>
<th>Group</th>
<th>Concept</th>
<th>Blend</th>
<th>Exploring routes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6 graders with no experience in project work. The students are unable to relate to one another and are inflexible</td>
<td>the epic genre – a project on People and Gods</td>
<td>Mother tongue, History, Geography</td>
<td>- develop group posters about one of the ancient legends of the Greek mythology - act a scene</td>
</tr>
<tr>
<td>2</td>
<td>5 graders with no experience in project work. The students are very energetic</td>
<td>the tale – a project on the main features</td>
<td>Mother tongue, Technology, Civics</td>
<td>- identify the features of the tale - develop a portrait of the hero - discuss the good and evil concepts in a tale - design a drawing or a scheme to summarize the features - design a Big Book to be used in primary classes</td>
</tr>
<tr>
<td>3</td>
<td>6 graders with one year experience in project work</td>
<td>the lyric genre</td>
<td>Mother tongue, Music, Visual Arts</td>
<td>- express emotions about poetry (why don’t we like poetry?) - express their understanding about one poem by means of a variety of symbolic codes (drawing, song, painting, expressive reading)</td>
</tr>
<tr>
<td>4</td>
<td>7 graders with one year experience in project work</td>
<td>poetry</td>
<td>Mother tongue, Music, Visual Arts</td>
<td>- develop a plea for poetry reading - persuade somebody that poetry is part of daily life (the symbolic code at their choice)</td>
</tr>
<tr>
<td>5</td>
<td>same 7 graders (as above) with one year experience in project work</td>
<td>short story</td>
<td>Mother tongue, Mathematics, Physics</td>
<td>- explain the inertia of human emotions - action and reaction in the fictional work - portrait of a character (the symbolic code at their choice)</td>
</tr>
<tr>
<td>6</td>
<td>8 graders with no experience in project work. The most difficult class in the school. They are very unmotivated</td>
<td>the novel</td>
<td>Mother tongue, Geography, Religious Education, Civics</td>
<td>- develop a poster/ a book/ a scheme/ a drawing/ a graphic organizer in order to express your view about the topic</td>
</tr>
</tbody>
</table>

### 3. Results of high quality

The results of the project work are amazing. Not only the students become more confident and motivated in learning literature but they also improve in relational competence and develop their acquisition in the topics that were considered for the interdisciplinary approach.

The results are remarkable for the students’ assessment, metacognition, products and exam requirements.

#### 3.1. The students’ assessment

The students start their project work with a self assessment statement about themselves and end it with a metacognitive one. It is important to highlight that students are open about their self-portrait. They reveal their weaknesses and strengths without the diplomacy of the adult. They are innocent and honest. Here are some brief portraits:

_I am stubborn. Sometimes I get angry very easily. But most of the times I am a good girl_ (Iuliana)

_I am cool, funny and very friendly. I don’t know how to bully other children and I think this is a very big weakness. I’m good at basket, graffiti and video games. I’m original and I have crazy ideas._ (Mihai)
I am quite shy. But with friends I am pretty talkative. My greatest problem is lying. I just can’t get rid of telling lies. Sometimes I am also wicked with other children. (Antonia)

I’m intelligent, resourceful, friendly, naive, naughty (Darius).

During the project work, I challenge students to interevaluate their unfinalized artifacts, because it is a certain way to learn from the others or to learn to accept that things might be better.

When the work is completed, the students fill in feedback statements and connect to their initial stage. Table 2 offers an example of such metacognitive exercise that supports students to observe their progress along the project work. The table was developed at the end of project 5.

<table>
<thead>
<tr>
<th>Initial stage</th>
<th>Final stage</th>
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<tbody>
<tr>
<td>I do not know. I have no idea what inertia is. (Mihai)</td>
<td>Inertia is a property of all bodies. It makes you stubborn.</td>
</tr>
<tr>
<td>I cannot give a concrete example. I did not understand what inertia is. (Antonia)</td>
<td>Where you’re in love, constantly keeps you afloat and you tend to maintain that state.</td>
</tr>
<tr>
<td>I do not know. (Maria)</td>
<td>It is a property of all bodies, including ours, we are bodies, too.</td>
</tr>
<tr>
<td>I cannot see how Physics would help me in everyday life. (Sabina)</td>
<td>It is interesting to see the world from multiple perspectives, but not with definitions from the book. I wish we did in Physics as we had done in Romanian</td>
</tr>
</tbody>
</table>

Assessment needs a lot of reflection and is time consuming. The results are gathered in a observation grid which is designed according to the competences. I analize their artefacts, their final statements and their individual portfolios. Every group gets a mark and the final mark for every student is the arithmetical mean between the group mark and the portfolio mark.

3.2. The products

At the beginning of the project the students seem to be a little puzzled. For two or three hours, they just discuss and think the things over and over again. They work very much in class, but they also communicate via email or by phone. They sometimes get so very much involved in the work that they meet at home to redesign or finalize the artifacts. They progressively pass from task to task and, in the end, they manage to present beautiful artifacts that show a deep understanding of the text.

The Figure above is an artifact from the project on the short story, namely the conflict among the characters by means of the analogy of the inertia of emotions. According to the text they read, students observed that negative emotions manifest high inertia (“we cannot get rid of them easily!”); positive emotions manifest low inertia.

In all the six projects, the students had the opportunity to reflect on their work. In the feedback statements they mention their progress in communication and relationships as well as in the academic acquisition. A bonus of project work they always highlight is “fun”. Here are some of their remarks:
“Teamwork is definitely better than individual stuff. It was good to share ideas. We did part of the project at Stefan’s and we had a great time. We were all having ideas, we all contributed but we also had great fun. I hope we’ll have a new project soon.”

“We do things better together. We also learned to work more diligently and that’s not so difficult when you get involved...”

“I learned what a project team means and why we need somebody else’s idea. Well, I can hardly believe that but I started to listen to what others say!”

“Now we trust one another”

The final assessment constantly contradicted the teachers and parents shared cliche according to which project work might be fun but it is useless when it comes to exams. At the end of each project we had a special time when we questioned what if this and that topic were exam items. The deep understanding of the text allows students to give very consistent replies in terms of exam content.

4. Last but not least

The analysis of the results show that, irrespective of the initial profile of the students, the multiple representations in interdisciplinary project work promote deep understanding of the literary text as well as of the concepts from other school subjects that contribute to the integrated approach. Students become more responsible and change their attitude towards learning. The multiple perspective on the operational concepts and on the literary text determined authentic responses. The children’s remarks are worth more than any sophisticated statistics. They are genuine, profound and demonstrate active involvement. Project work is academically beneficial and it is fun. (see Fig. 2).

From this perspective, it might reconcile quality school and quality play.

Fig. 2. Project work involves good work. And it brings a lot of joy.

In order to plan an interdisciplinary approach, the teacher needs to rethink his/ her comfort zone. Not only because s/he needs to try and get familiar with topics from another domain but because interdisciplinarity in school can shatter the traditional isolation and give rise to a community of learning. In Romania, we do not quite have the practice of cooperation within a school. Nor did my students have it. And yet, after project work they changed compass – and it has been worth.

Last but not least, project work can help us teachers to understand it as well – it is good to change ideas, far better than to stay in isolation.

References