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SHORT COMMUNICATIONS

The Educator

A journal of educational matters

The objective of this annual, peer-reviewed journal is to publish research on any aspect of education. It seeks to attract contributions which help to promote debate on educational matters and present new or updated research in the field of education. Such areas of study include human development, learning, formal and informal education, vocational and tertiary education, lifelong learning, the sociology of education, the philosophy of education, the history of education, curriculum studies, the psychology of education, and any other area which is related to the field of education including teacher trade unionism.

This journal accepts articles from teachers, academics, administrators, graduate students, policy-makers, education specialists and any other author or researcher whose work contributes to the different facets of education and related areas.

It is the aim of ***The Educator*** to publish articles which cover particular dimensions such as:

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b. The examination of educational issues from a cross-cultural perspective.

c. The inclusion of substantive findings that may be of help to policy-makers and practice.

d. The examination of information technology in the field of education.

e. The implementation of research methods and measurement processes which are clearly presented.

f. The presentation of theories, models or conceptual frameworks in the field of education.

g. The exposition of research findings derived from comparative and cross-national studies in education.

h. The presentation and discussion of material derived from primary sources including archival documents, primary data and resource persons.

i. Any other dimension which the editorial board deems compatible with the overall objectives of the journal.

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Producing and Assessing the Effectiveness of a Learning Programme for Children on a Heritage Site

St Agatha's Complex, Rabat, Malta: a case study

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Introduction

Museum visits[1] form an integral part of every school programme. Such visits are highly encouraged by the National Curriculum Framework (2012), promoting inquiry based learning on heritage sites for all years in the school cycle. However, education in Maltese museums is still in its infancy (Vella, 2009). Over the past few years some attempts have been made by Heritage Malta (the National Agency for Heritage) and other heritage trusts to improve museum learning by preparing worksheets which students need to complete while following the guide around the museum. Yet this is not enough, especially when considering children[2] as a demanding category of museum visitors. They come to museums full of excitement, which however is often lost as demotivation, physical and cognitive fatigue reign (Maxwell and Evans, 2002). One teacher participating in this project provided a succinct explanation for this: "Usually museum visits are quite unexciting, especially when children have to listen to a guide without being able to explore and participate in hands-on activities."

This deficit in local museum education served as the impetus to carry out this project, which endeavours to discover what is needed to create an effective learning programme, put it into practice and assess its effectiveness. The project aspires to shift the visitor from the traditional passive role to an active one. It aims to involve the students holistically: physically, intellectually and emotionally. This holistic involvement was conceptualised through the constructivist learning theory (Hein, 1995, 1998; Hooper-Greenhill, 1997, 2007), which focuses on the visitors rather than the museum. It acknowledges that visitors are unique and come to museums with their own prior knowledge and experiences (Hein, 1998). This awareness has informed the project activities to suit the different learning styles of the young visitors. To complement this, generic learning outcomes (GLOs) were set to broaden the spectrum of learning.

These ideas were put into practice at St Agatha's complex (catacombs and museum), a small site managed by a NGO. The administration accepted the proposal of the project as it was considered a twofold opportunity – for its educational value and also as a means to attract more students to the museum.

Defining Learning

This endeavour to produce an effective learning experience in a museum required a strong understanding of what 'learning' means. Learning is a complex process - Falk and Dierking (2000) call it "a tricky business"– and so is the task of defining it. In this quest I decided to narrow my search to those definitions proposed and used by museum educationalists, which make them more appropriate to cultural contexts. Learning in museums presents an even more complex situation than in formal schooling since, as suggested by Hooper-Greenhill (2007), visitors come to museums with their own idea of what museum learning is. Learning is frequently narrowly defined as the acquisition of new knowledge.

A much more encompassing definition of learning has been adopted by the Inspiring Learning Framework developed by the Museums, Libraries and Archives Council (MLA) in England, in the 'Campaign for Learning' (MLA, 2008):

> *"Learning is a process of active engagement with experience; it is what people do when they want to make sense of the world. It may involve the development or deepening of skills, knowledge, understanding, awareness, values, ideas and feelings, or an increase in the capacity to reflect. Effective learning leads to change, development and the desire to learn more."*

I have adopted this definition as a 'working definition' in this project, finding it valuable and inspiring for different reasons. Apart from focusing on knowledge, it deals with a person holistically, bringing to the forefront skills, values, feelings, awareness and ideas, five characteristics which a visitor should experience in a museum. This view of learning affords the visitor the opportunity to be active and not a mere passive receiver of knowledge. Being active is likely to increase the desire for more learning, with activity and learning forming an 'endless loop'. With regard to knowledge, we do not always learn 'new' facts; indeed we often give a new meaning to the information we already possess, or associate the 'new' facts with our prior knowledge (Hooper-Greenhill, 2007). This deepening of knowledge is acknowledged in the MLA definition above, and embraces the main philosophy in the learning theory of constructivism.

Museums and Learning

In his report about the role of museums as educational places in the UK, Anderson (1999, p. 8) sets out that "museums at their finest are universal educational institutions of immense expressive power and authority." Indeed, museums are remarkable sites for learning. Anderson's definition of museums fits perfectly with the MLA definition of learning.

"[Museums] allow us to learn through our senses … in ways that give us pleasure. They develop our feelings as well as our powers of perception, analysis, ethical awareness, imagination and creativity." (Anderson, 1999, pp. 8–9)

In providing the best learning experience, learning theories are an appropriate toolkit to museum educators. This has been recognised during the years, as learning in museums has developed in line with current learning theories influential in different educational environments (Hein, 1998; Hooper-Greenhill, 2000). Using Hooper-Greenhill's (1997, 2000, 2007) metaphors, museum educators should avoid using the epistemologies employed in the 'modernist museum' and aim for the 'post-modernist museum'. This calls for a transit from the passive museum to a museum that stimulates visitors to learn, engages visitors through senses and feelings and develops their ideas and skills.

The modernist museum

The necessity of the shift from 'modernist' to 'post-modernist' museum cannot be understood unless one identifies the characteristics of the 'modernist museum'. These characteristics were put forward by Hooper-Greenhill (2000), who claims the superiority of what she calls 'post-modernist museums'. The notion of the 'modernist museum' highlights the dominance of two philosophies: the behaviourist and the positivist philosophies. The behaviourist philosophy perceives learners entering the museum as having no prior knowledge and as leaving the museum with the knowledge provided by the guide. Learning is seen as an aggregation of small facts and experiences in an incremental way that ultimately result in knowledge (Hein, 1995; Hooper-Greenhill 1997). The positivist epistemology considers visitors as neutral observers, who are offered no space for interpretation, and objects "as a source of knowledge in

themselves" (Hooper-Greenhill, 2000, p. 127). Knowledge is external to the learner (Hooper-Greenhill, 1997), and the museum is set aside from the real world and offers no connections with the visitor. The role of the visitors is of passive 'receptacles', merely accepting what is set for them by the authoritative expert (Falk *et al,* 2006).

Furthermore, the modernist museum does not offer space for the unique individual, and assumes that all individuals learn in the same way. As contended by Hooper-Greenhill (1997, p. 2), visitors are all categorised as the 'general public', with the main focus being the museum itself and not the learner. Although museums, in particular those in Malta, are unfortunately still in line with the notion of the modernist museum, literature has moved forward to focus more on the unique visitor. This gives rise to the post-modernist museum.

The post-modernist museum

The superiority of the post-modern museum is evident in the way it puts at its heart the educational needs of the visitors and gives space to the *active* visitors to make their own interpretations and construct their own knowledge (Jeffery-Clay, 1998). As I see it, the post-modern approach embraces the constructivist learning theory. The fulcrum of this theory is that learners continuously construct knowledge and reorganise it in their mind. New facts are associated with the ones already possessed, and elaborated (Hein 1998). Learning happens once the new information and the new experience are fitted into a frame within the learner's mind (Hooper-Greenhill, 2000).

The constructivist museum affords visitors the opportunity to make connections with familiar concepts and objects, hence the importance constructivists put on visitors' prior knowledge (Jeffery-Clay, 1998), interests, beliefs and experiences (Falk and Dierking, 2000). Visitors use their prior knowledge and experiences to make meaning of new learning in the exhibition and to interpret new experiences (Hooper-Greenhill, 2007). This indicates how the power is now in the visitor's hands – or perhaps more appropriately, in their mind.

The importance given to learners' prior knowledge and experiences aligns with Hooper-Greenhill's (2007) claims on how post-modernist museums

acknowledge visitors as coming with their own unique, personal meaning. There is no one truth, no singular unified interpretation, but subjectivity, where meanings are plural and diverse (Hooper-Greenhill, 1997). Since all individuals are unique, and hence the contexts of interpretation are different, one cannot expect interpretations to be the same.

The constructivist museum into practice

The shift to the constructivist museum brings with it a number of complex challenges.

Active Learners

For learners in the museum to be able to construct their own knowledge, active involvement has to be a priority (Hooper-Greenhill, 1997). From the literature on the topic three different, yet intertwined, levels emerge on which engagement and stimulation of visitors can occur – physically, intellectually and emotionally.

Physical engagement is inevitable in museum learning. Hands-on experience or play is stimulating for learners – using the body for touching or experimenting historical or cultural artefacts as advocated by Weier and Piscitelli (2003).

Yet, a mere physical activity cannot make meaningful experience. As Witcomb (2006) emphasises, the most important factor is that of inspiring and provoking exploration in the learners, an activity which leads to intellectual involvement. The popular hands-on approach, which however might lack actual mental activity, is complemented by Hein's (1998) support for a 'minds-on' approach. Visitors will thus be given the opportunity to solve problems, form their own conclusions, and create a 'conversation' with the object, to *think* while engaging physically in the activities.

Both physical and intellectual activity need to engage the feelings of the visitor. Indeed, Hooper-Greenhill (2007) claims that feelings and emotions help the learner get directly involved in the activities. Offering experiences of joy, anger, excitement, empowerment, success, and other emotions enable the visitors to personalise their museum experience. In addition, an emotional approach to the museum is more likely to leave an imprint in

the visitor's mind and long-term memory (Trombini, 2003; Desantis, 2003). This can stimulate the desire to learn more, trigger the urge to return to the museum, and alter the unfortunately popular view that museums are 'old boring buildings'.

Learning Outcomes

It is still very common for museums to set specific learning outcomes for visitors, as in formal education. By the end of the visit learners are expected to have reached commonly-set outcomes, such as knowledge on a particular topic or basic archaeological skills. However, such specific learning outcomes are more appropriate in a classroom-based setting, where specific outcomes need to be reached and measured by appropriate assessment by the end of a set period (Hooper-Greenhill, 2007), and where the audience is also known and hence such outcomes can be adjusted to the particular learners.

As discussed earlier, individual visitors in post-modern museums are perceived as unique, who thus learn in different ways and are influenced by their prior knowledge. Indeed, even if a particular museum visit is chosen by teachers to correspond to specific learning outcomes, students will all learn something from the museum, which is likely to be different from that planned. Hence, specific outcomes cannot be set by museum educators. On the other hand, it is difficult for the museum visitors to set their own outcomes, as these are often "unfocused and undeveloped" (Hooper-Greenhill, 2007, p. 321). The solution to this, as suggested by various museum educationalists, is to broaden the learning outcomes (Falk and Dierking, 2006; Hooper-Greenhill, 2007). This ensures that the learning experiences of the visitors are not limited but are left open to their learning styles and prior experiences (Hooper-Greenhill, 2004). The Generic Learning Outcomes (GLOs) framework for cultural settings[3] provides an appropriate framework to suit the needs of museum learning projects. The framework presents learning in terms of a broad range of dimensions:

Enjoyment, Inspiration and Creativity
Knowledge and Understanding
Skills
Attitudes and Values
Activity, Behaviour and Progression.

Each GLO is then divided into various sub-categories which help to broaden further the type of learning. In the project described in this article, these GLOs were adopted both in the planning of the activities and in the post-visit evaluation of learning.

The GLOs go beyond the usual specific knowledge and skills. In providing a personal meaningful experience, the outcomes of the visit are broadened to enjoyment, attitudes and skills, and not solely to the content of the exhibition. Learning might still have occurred if the child has not learnt a great deal about the targeted topic but has yet *enjoyed* the visit. The visit might have still benefited the learner by changing his/her attitude on museums or on the culture being exhibited.

Methodology

The research study involved four schools, two from the primary sector and two from the secondary area, with six classes from the former and two from the latter. The age of the 170 students ranged from nine to twelve years.

Data-collection methods included two focus groups with students, and a questionnaire with the teachers of the eight participating classes in the planning phase of the project. The teachers and students participating in the learning programme also completed respective post-visit questionnaires. Teachers were asked specific questions about the activities and on whether the Generic Learning Outcomes were met in their broad sense. As for the students, these were asked to respond to a stimulus statement through drawing or writing: "What amazed me most at the visit to St Agatha's catacombs and museum was …", and then tick 'yes' or 'no' to a small number of other closed-ended statements. The latter were related to the five GLOs.

The learning programme

The learning programme consisted of three activities which concentrated only on artefacts from the Roman period.[4]

1. *Exploring the catacombs*: Prior to entering the catacombs, the students had the opportunity to understand the position of the catacombs with respect to the ancient Maltese city of Melite and compare its position to modern cemeteries. Both burial sites were placed away from the city centre. Inside the catacombs, apart from discovering the various tombs on the site, the students experienced a re-enactment of the rituals of the first Maltese Christians by wrapping bandages around a mannequin and celebrating the meal around the agape table.

2. *Working as detectives*: This activity took place in the museum. Various modern objects (plates, bowls, earthenware oil lamps, jars, glass and pottery objects, jewellery, perfumes, coins and sewage drains) were presented to the students, together with a worksheet where they had to list the modern objects and then roam around on their own to find the corresponding artefact from the Roman period. From the objects found in the museum students had to deduce how the Romans lived in Malta and express this through writing or drawing. They were later asked to examine the change and continuity between the Roman period and today.

3. *Working as archaeologists (hands-on session)*: The young visitors had the chance to handle a two thousand year old artefact (either a small plate or an oil lamp). In this way students appreciated original artefacts, even if they were small objects. In small groups, students worked as archaeologists. They were given an artefact form to fill in, describing, measuring and drawing the artefact.

Each activity was matched to the GLO's mentioned above and to curriculum targets (not only the History curriculum but also that of Religion, Social Studies, Art and Languages). Teachers were also presented with pre- and post-activities to discuss in class.

Project analysis

The effectiveness of the learning programme

The effectiveness of the programme was measured by the extent to which learning, perceived in its broad definition, occurred. In providing a personal meaningful experience, the intention of this project was not just to lead students to specific outcomes on the Romans, but more widely to:

a. enjoy museum visits and appreciate better our culture,
b. develop their thinking skills,
c. have the opportunity to experience team-work.

The above outcomes were informed by the work of Falk and Dierking (2006) and Hooper-Greenhill (2007). As already pointed out, these outcomes are best reached if students are actively engaged. The working definition mentioned earlier states that "learning is a process of active engagement with experience" (MLA, 2008). Active participation helps to create personal meaning, making the visit experience more significant to the learner (Hooper-Greenhill, 2007; Hein, 1998). This reiterates what one participating teacher has affirmed: "Active participation in rituals enhanced learning and made it more interesting, [and thus] made it more meaningful."

Another teacher appreciated that her students were not only engaged physically but also intellectually. She reported that students felt positive about the activities because "they were engaged, they were active and had to think critically" and were not expected to merely accept what was being told to them.

Did learning occur?

All participating teachers agreed that, "children liked the activities because they had the opportunity to learn by doing, rather than just listening and looking." However, mere participation is not enough; it is essential to pose the question of whether learning really happened. In their questionnaire responses the teachers indicated that learning has occurred in all the four activities of the programme.

The *kind* of learning that occurred is an equally important consideration. Both teacher and student post-visit questionnaires were analysed for this purpose. The Generic Learning Outcomes framework was used to assess the type of learning and the extent to which it had occurred. Below, each GLO is discussed separately, providing examples of how learning occurred.

Enjoyment, Inspiration and Creativity

Museums are not always considered by students as enjoyable places, and are often associated with school work. This project wanted to break down

this misconception, and hence prioritised the GLO 'Enjoyment, Inspiration and Creativity'. This was done by planning activities that are intellectually active. In line with the findings reported by Hooper-Greenhill (2007), such activities would prove to be more enjoyable to young visitors.

A high 98 per cent of the students answering the post-visit questionnaire in this project stated that overall they had enjoyed the visit to St Agatha's complex. A similar high percentage indicated enjoyment in each specific activity. This was also confirmed by an absolute majority of students in their textual and visual statements of the objects and activities they found enjoyable. These results were supported by the teachers' responses, which rated the four activities as highly enjoyable for the students.

Students were fascinated and intrigued by their descent in the catacombs. As one teacher put it, this is "not an everyday experience", adding that "students enjoy dark, underground, mysterious places". The sense of mystery was incremented by the skeletons within the catacombs. The questionnaire responses showed that students were struck by the various bones found in the tombs. Indeed, drawings and written statements about skeletons were the most frequent response to the stimulus statement, especially amongst the boys (Fig. 1).

Historical artefacts were also a source of enjoyment to many students. Rachelle expressed amazement at seeing things that she actually uses nowadays (Fig. 2). Simon was similarly amazed by the agape table in the catacombs: "I liked it as it was so beautiful and I never saw one".[5]

The students' responses clearly confirm that they had enjoyed, in particular, *touching* the artefacts. In fact 94 per cent of the students expressed enjoyment in the hands-on session. For instance, Nicholas was delighted "when we took in our hands the objects from the Roman period".

The students' enjoyment on touching Roman plates and earthenware oil lamps was confirmed by the teachers in their questionnaires: "Even I as a teacher never touched Roman remains. So imagine the children's fun in touching with their own hands 2000 year old remains"(teacher, girls' class)

It was clear that some students enjoyed observing particular artefacts due to their prior knowledge, interests or experiences. Rachelle's attraction to the Roman perfume bottle and hairpins was probably due to the fact that

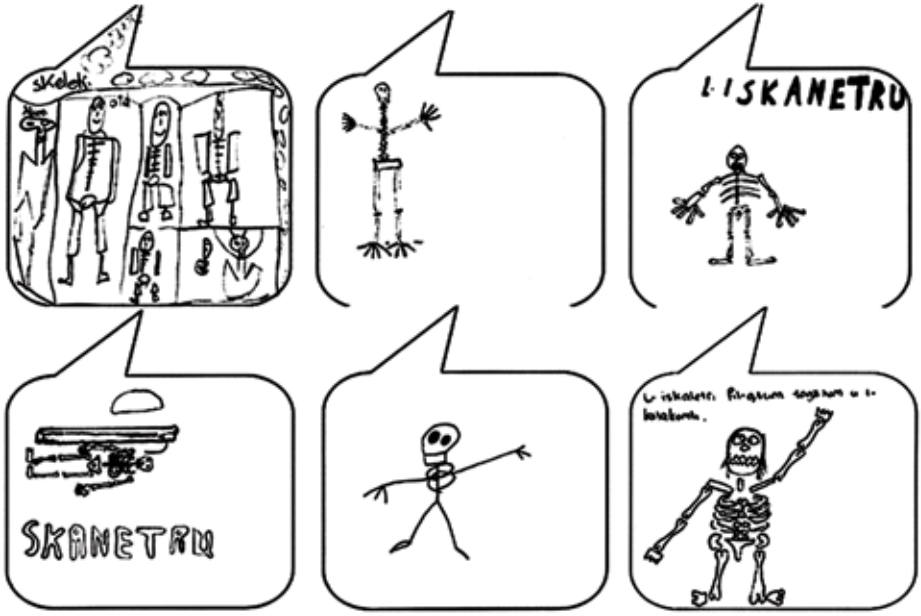

Figure 1. Drawings of skeletons made by students in responding to the stimulus statement.

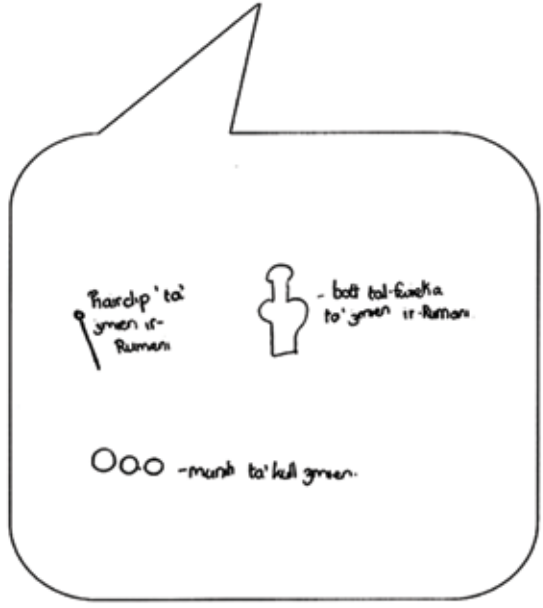

Figure 2. Rachelle drew Roman objects (hairpins, perfume bottle and coins) that she still uses in their modern version.

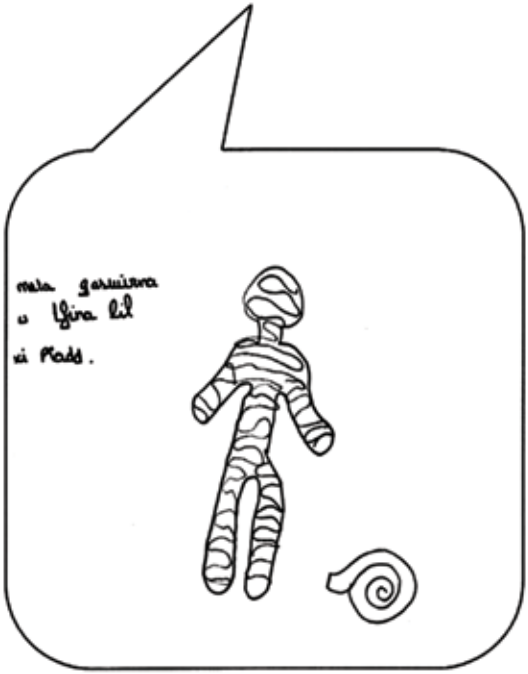

Figure 3. Nicole enjoyed participating in the ritual of wrapping the dead body.

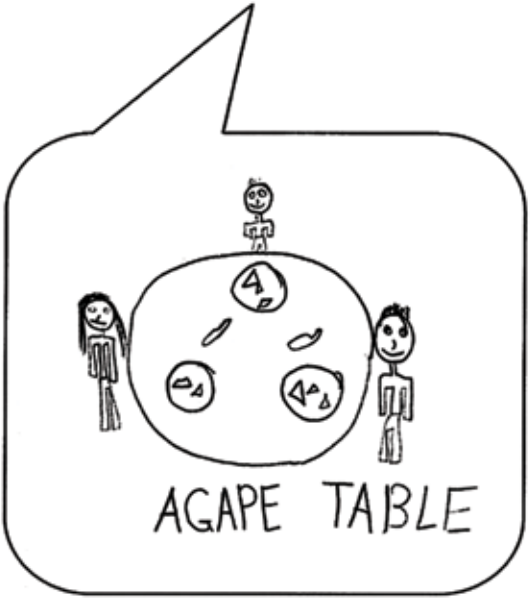

Figure 4. Adam drew himself and two other classmates while taking part in the ritual around the Agape table.

she uses similar objects every day. She applied her everyday experience to the museum situation. Similarly, boys were mainly attracted to the skeletons in the catacombs due to their prior interests (such as toys, cartoons, etc.). In line with Hein's (1998) claims, students associated the Romans objects or skeletons with objects or experiences they were already familiar with.

Apart from artefacts, actual participation in the activities was found enjoyable by students. Daniel explicitly wrote: "We did a lot of beautiful activities that you enjoy doing. They were like games."

Students made reference to specific activities as particularly enjoyable. One such activity was the re-enactment of the rituals performed by the early Christians in Malta in the catacombs. Nicole was amazed when "we wrapped and buried someone,"and drew the wrapped dummy (Fig. 3).

Adam imagined himself with two other students as Christians during Roman times and ate pita bread around the agape table. After three weeks he could still draw the scene exactly as it occurred during the activity (Fig. 4). A high 94 per cent shared the same enjoyment as Nicole and Adam in the re-enactment activity.

Meanwhile, Annalise enjoyed being free to roam around the museum so that she could compare the objects of today with those in Roman times. This indicates that she was afforded space to choose her own sequence of how to go around the museum, an approach which Hein (1995) calls for in a constructivist museum.

For the scope of the project, students' enjoyment was vital, since learning is made easier when it is enjoyable (Hooper-Greenhill, 2007). The experience of a new place such as the catacombs, and touching or observing objects which students have not seen before, facilitates stimulation and motivates students to learn and construct their own personal meaning of the visit (Hooper-Greenhill, 2004).

Knowledge and understanding

Enjoyment allows children to be in a more comfortable mental position, and this makes it easier for children to construct facts and information in their minds. Daniel felt excited going down into the catacombs. This helped him to "learn a lot about them" (Fig. 5).

Figure 5. Daniel felt excited going down in the catacombs; this helped him learn more about them.

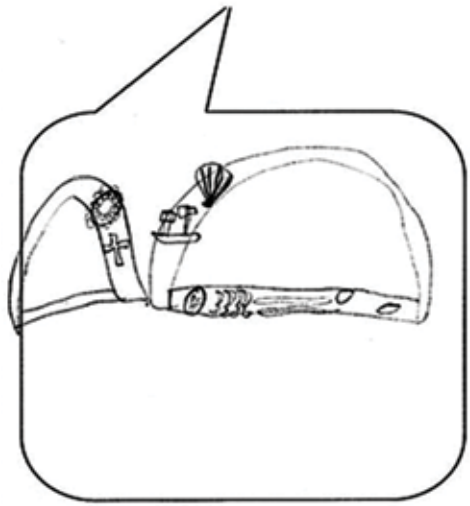

Figure 6. Karl was amazed by the Christian frescoes on the tombs in the catacombs.

Knowledge and understanding can occur through a number of ways depending on the learning style of each student; some learn through discussion, others through observation or by touching artefacts (Hooper-Greenhill, 2007). Of the students in this study 95 per cent felt that they had learned more about the Romans after the visit. Students' learning was further confirmed by all the teachers who agreed that their students had accumulated more knowledge about the Romans.

Knowledge was also evident from the students' drawings and comments to the stimulus statement. Rebecca wrote that through the ritual activity in the catacombs she had learnt how the first Christians used to wrap the dead body before they buried it. Gabriel was also impressed by the burial methods used in Roman times. Learning was also evident in Karl's free drawing, which included various Christian symbols he had observed in the frescoes found in the catacombs (Fig. 6).

The students' responses to the stimulus statement also showed that apart from gaining knowledge, they managed to link the new facts with their previous knowledge about the Romans as well as with their everyday experience and interests. Most girls were impressed by the way Roman women used to do similar things to those of today; they learnt that the life of a Roman was similar to theirs in many aspects. Rachelle wrote: "It was interesting how even Roman women used to wear things to look beautiful."

Eliza was surprised when she came to know that hairpins were used by the Romans too. Students' ability to make links with their everyday life resulted in a better understanding of how the Romans lived. This is supported by similar findings by Hooper-Greenhill (2007). As succinctly put by one teacher: "the children felt the Romans closer to them as ever before."

Skills

When compared to the two previous GLOs, there were very few drawings or comments in the stimulus statement that related to the 'skills' GLO. Such responses described their experience of team-work, and of observing and comparing objects of today with those used in Roman times.

Social skills were practised during team-work throughout the learning programme. Rather than acquiring new skills, the students consolidated existing ones. I identify with the views of one of the participating teachers: "I

wouldn't necessarily say increase; rather consolidate." In a one-off two hour programme learning new skills is difficult; instead, the students practised social skills which they normally use in other learning environments.

The vast majority of the participants (95%) claimed that they enjoyed working in a team. Some students made particular reference to team-work as an enjoyable and desirable activity. Juan, for instance, claimed that what he liked most during the visit was "that we worked together as a group." These findings align with those emerging from the studies collected in Hooper-Greenhill's (2007) work, where the students observed in these studies showed the same response to team-work in museums.

Nevertheless, my data showed that group work might impede learning in the museum to intra-personal learners who prefer to work on their own. Laura claimed: "Working alone is better, as no one can hinder my work and you are not always with the persons you would like to be."

This links to another drawback, or rather difficulty, in organising team-work. Although students should feel comfortable with their teammates so that an enjoyable atmosphere conducive to learning is created, on the other hand adhering to students' preferences regarding team members is not always logistically possible. Matthew "was sad because I was not with my friends, neither in the bus nor in the museum." This feeling is likely to have led to his negative response to the statement on whether he had enjoyed the visit to the catacombs and the museum.

The other skills practised in the activities were observing and comparing today's objects with those of two thousand years ago. Unlike group-work, no direct reference to this skill was made in the students' questionnaires. However, 91 per cent of the students responded that they had enjoyed the treasure-hunt activity, where this skill was practised. Other students referred to this skill in their response to the stimulus statement: What amazed him most … [was] "when we compared the Maltese of today and the Roman period" (Alessio).

Attitudes and Values

Although each GLO was assessed separately, they are indeed interdependent. A cultural setting that offers enjoyment, a comfortable setting for self-construction of facts and information, and consolidation of

skills, is likely to leave an impact on the visitors' attitudes towards museums. All the participating teachers considered it "very likely" and "quite likely" for the visit to have increased students' positive feelings towards visiting museums. This was consolidated by the teachers' comments on students' feedback after the visit: "The majority of children felt positive about the visit and asked for more such visits."

The positive attitude towards museums and their artefacts is demonstrated by 77 per cent of the students who claimed that after the visit they came to like museums more. Although a higher percentage would have been more elating, the result is still definitely positive, especially when museums are often considered by students as boring places. It is interesting that 96 per cent of the students further confirmed that the museum was a good place to learn in a different way from how they learned in the normal school setting.

Mireille expressed a positive attitude not just towards the museum as an organisation, but also towards the ancient objects found inside. She stated that what amazed her were: "the old objects that were used in the times of the Romans as they are things that we need to cherish."

The learning programme influenced the pupils' attitudes towards the Romans. Students came up with positive comments about the Romans, describing them as 'intelligent', 'advanced' and even 'cool'! Others found the Romans very similar to us:

> "They used the same things we use today."
> "They used to wear like us and take care of their looks as we do."

Other students had attributed what we have today to the Romans.

> "The things we have today come from the Roman period."
> "If they did not exist, the world today would have been very different."

Through the activity Alessio also managed to change his opinion about the Romans:

> "They were more advanced people than I had thought before the visit, and I realise that certain inventions were created by them."

These positive attitudes are consistent with the findings of Hooper-Greenhill (2007), where the museum visit similarly affected the pupils' attitudes towards museums and towards other people.

Activity, behaviour and progression

It was difficult to assess properly this last Generic Learning Outcome in this project, as it would take weeks, months or even years to show exactly whether any progression or any change in behaviour have resulted from the visit. Due to time restrictions, such assessment was not possible. However, the project could evaluate intentions and anticipations. A good 85 per cent of the students claimed that they would visit St Agatha's complex again. Teachers were also optimistic, anticipating that the visit would help their students be more knowledgeable about the Romans, and this would help them in their school lessons and assessments.

Conclusion

This project sought to plan and assess the effectiveness of a learning programme in a museum. The interest in this project was spurred by the poor state of present learning programmes in local museums. The aim was to create a programme where learning could occur in different ways and is not restricted to the specific content of the museum. For this purpose the five generic learning outcomes developed for the *Inspiring Learning for All* framework were applied.

Was the programme effective?

An assessment of the effectiveness of the programme requires a measurement of the learning that occurred. This needs to consider the definition of learning given at the outset of this article: "[Learning] may involve the development of deepening of skills, knowledge, understanding, awareness, values, ideas, and feelings, or an increase in the capacity to reflect" (MLA, 2008).

Considering the GLOs above, the programme has satisfied this definition of learning. It would not be presumptuous to claim that every student has learnt something, even if this was done differently, depending on their learning styles, their senses, their emotions, their prior knowledge and experiences.

The process

The above successful results were obtained through the following process:

- Involvement of both students and teachers in the planning stage to inform the museum educator what both 'clients' desire in a museum learning programme;
- Planning of activities based on the constructivist learning theory, with a focus on students' prior knowledge, experiences and interests;
- Each student is considered as an individual, and thus planned activities took account of different learning styles and set generic learning outcomes;
- The activities are engaging and involve the person holistically.

Although this might not be the only process for developing effective learning programmes, it proved effective in my case study, and hence it is one which I do recommend for the planning of museum visits. As expressed by one participating teacher: "This visit confirmed that a museum can be very different and very interesting."

Notes

1 For practical purposes, throughout the project the word 'museum' referred to both museums and heritage sites.

2 The term 'children' in this project referred to students aged between nine and twelve years.

3 This framework was applied by the *Inspiring Learning for All* framework and was created for the MLA Council in England, available at <http://www.inspiringlearningforall.gov.uk/toolstemplates/genericlearning>

4 St Agatha's Complex consists of catacombs from the paleo-Christian period and a museum which displays artefacts from various periods in the history of Malta.

5 Since the students' questionnaires were presented in Maltese, their comments reported here are translated to English. Care was taken to ensure faithfulness to their statements. Pseudonyms were used to protect the identity of the participants.

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Kreattiv - Enhancing Artistic Development

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Sustainable qualities of Creativity

> *"Creativity is understood as the human capacity, through imagination or invention, to produce something new and original in order to solve problems. It is a unique renewable resource. Creativity enables individuals to expand their abilities and develop their full potential. In today's global, knowledge-based societies, creative assets are generating new forms of revenue and employment that are spurring growth, in particular among youth. Releasing diverse sources of inspiration and innovation, creativity contributes to building open, inclusive and pluralistic societies. As a multi-faceted human resource that involves processes, environments, persons and products, creativity can inspire positive, transformative change for future generations*." (Cliché & Medici, 2013, p.38)

Creativity is a complex notion which is of great interest to many educationalists and cognitive psychologists. This UNESCO (2013) definition of creativity underlined by Cliché and Medici (2013) distinguishes it from other definitions, as it provides the creative concept with a certain 'transformative' power that will enable a "forward-looking human development" plan that UNESCO aims to bring about in future years, not only in the area of social development but also in that of economic development – two areas which were so far traditionally considered "worlds apart" (European Commission, 2010, p.12).

The Convention on the Protection and Promotion of the Diversity of Cultural Expressions (UNESCO, 2005) conveys the idea that governments should support creativity if they want to have positive results from the creative economy (Cliché and Medici, 2013). This is further emphasized by Shaheed (2013) whose report outlines the negative impact of multiple laws and regulations conducted by governments, such as censorship, and by other societal divisions, like religion. In such cases, these support structures are not just restricting artists' expressions, but are ultimately restricting a widely positive, progressive, creative, human and economic development plan which the Draft Medium Term Strategy (UNESCO, 2013) deems necessary for human development (Cliché & Medici, 2013).

The growing economic importance of the creative industries has also become a central theme on the Maltese political scene. In fact,

"Malta is currently developing a national strategy for the cultural and creative industries. [...] The aim of the strategy is consistent with the vision of Malta's new cultural policy in transforming the cultural and creative sector into the most dynamic facet of Malta's socio-economic life in the 21st century, with the first national milestone being the hosting of the European Capital of Culture in 2018." (Creative Economy Working Group, n.d., p.i)

Recently, the creative economy has been viewed as showing positive results in the areas of entrepreneurship, sustainability, innovation, technological change, developing freedom of expression and dialogue. It looks also effective in terms of facilitating mobility, improving social benefits and the attitude towards them, such as, diversity and community participation. These positive outcomes will only be visible if people start taking a holistic approach towards the Cultural and Creative Industries or CCIs (European Commission, 2010, p.7).

It is at this point that the Kreattiv programme will be of interest to everyone who works in the creative industry, even teachers, since it has the potential to use creativity as a sustainable strategy; thus having the possibility to yield tons of benefits in key areas of creativity, holism and transformative learning. In fact, research shows that holism has the potential to be the fuel behind the creative economy since it embraces "imagination, originality, concentration, interpersonal skills, taste for exploration, critical and nonverbal thinking" (Green Paper, 2010, p.18).

Funding Arts Schemes

The Maltese government has been supporting creative practitioners in recent years through the Malta Council for Culture and the Arts which has progressively invested in several Art Programmes, Art Scholarships, Culture Cards, and other Arts Funds (Creative Economy Working Group CEWG, n.d., p xiii) all with the aim of achieving a more "forward-looking Maltese Cultural Identity". One of the funding programmes that benefitted from these schemes is the Kreattiv scheme – an initiative of the Ministry for Tourism, Culture and Environment in 2011. In fact, artists in schools programmes provide for the collaboration process of bringing artists, teachers and students to work together towards the production of innovative and artistic outcomes.

As stated earlier, the culture and creative industries impact positively on the social and economic sectors (European Commission, 2010). In order to ensure this creative growth the Minister of Finance, Economy and Investment in the Budget 2009 speech had announced the Creative Economy Working Group. The objectives of this group echo the ideas put forward by the Convention on the Protection and Promotion of the Diversity of Cultural Expression (UNESCO, 2005), the Green Paper by the European Commission (2010) and more recently, the Draft Medium Term Strategy 2014-2021 (UNESCO, 2013). Therefore, the CEWG's objectives are centred on analysing multiple ways to maximise the creative economy of Malta, even, if necessary, through fiscal measures, investments and minimizing bureaucracy. In fact, it acknowledges CCIs as a pillar of Malta's economy, if Vision 2015 "to make our country a centre of excellence in various sectors, including that of creativity" (CEWG, n.d., p. iii) is a commitment that will be taken up and developed as proposed.

As a direct outcome, Kreattiv was one of the programmes which benefitted from the 2011 Budget funds allocated towards the development of CCIs in Malta. In fact, the programme was allotted 80,000 euro from which 18 projects out of 33 benefitted in that scholastic year (Malta Council for Culture and the Arts, n.d.). One may argue against the fact that not every project is chosen. This article will provide an insight on the method of the selection process adopted by CEWG, when having to select the participating schools. However, it is not the objective of this study to compare the selected projects with those which were not chosen.

Kreattiv- Funding Programme

In this study, the present author will be focusing on analysing the first principle of the Kreattiv Guidance Notes (2011), which states that the fund aims to "initiate creative programmes/projects in classrooms, schools and colleges through partnerships between teachers, students and creative practitioners and, in so doing, to facilitate creative education as a key tool for holistic development" (p.2). Furthermore, it is hoped that this article would help the readers to consider the actual benefits brought by such a programme and whether or not holistic development leads to transformative learning.

The creative sector includes Visual arts such as photography, sculpture,

painting, and exhibitions, as also filmmaking, design, crafts, video and architecture. It is one of the most competitive sectors within the CCIs in Malta which comprises a small number of local self-employed enterprises. This competitiveness shows that the products are relatively sound and thus, need to be developed more (CEWG, n.d., p.75). Although funding could provide the answer to the exploitation of the visual arts, funding also needs to be distributed fairly without having particular cultural sectors absorbing a bigger percentage of the funds available (CEWG, n.d.).

Moreover, the European Capital of Culture 2018 is also aimed towards providing a cultural experience that will "transform Malta into a hub for creative exchange" (CEWG, n.d., p.xi). In spite of the hoped for benefits a great amount of work still needs to be done in order to achieve higher quality standards in areas that are not purely related to the nation's historical sites. Therefore, it is essential to also focus on contemporary artistic expressions such as the creation of a contemporary art museum or the need for larger performance spaces. However the quality measures towards upgrading the standard of the contemporary arts are still not in progress and are still awaiting a number of other "infrastructural projects" before these can kick off (CEWG, n.d., p.xi).

In 2006, the UNESCO 'Road Map for Art Education' recommended an increase in budgets and resources allotted to Art Education (Vella, 2007, p.19). Currently, in Malta, the initiation of the Kreattiv funding programme increases the importance in the fields of creativity. Although the distribution of funds can be improved, the Government's commitment and persistence in increasing awareness of the overall benefits of the CCIs can already be a step towards developing a contemporary society that evolves from prior historical, social and economic connections. This has not only been acknowledged in Malta, but in other countries as well (especially those not affected by the recent economic recession), including Finland, Denmark, and Sweden. Well-planned strategies have been implemented to further support this creative sector especially because they have been showing great economic growth and creating new jobs (CEWG, n.d.).

However, not all artists are in agreement regarding the fact that governments commission creative projects (Brooks, 2011), such as funding projects similar to Kreattiv. For some, funding has connotations connected with a question of morality, right or wrong, and ultimately censorship (Brooks and Lewis, 2005). In fact, in the Kreattiv initiative funding may be said to have

links with a form of censorship because the awarding body is not giving the opportunity to all submitted Kreattiv proposals to benefit from this scheme. With regard to the selection process, one may wonder why some Kreattiv projects were refused; for instance, was there any connection to moral reasons? Other queries may also arise, such as, were the criteria purely bound to aesthetical and functional purposes, or perhaps some took into consideration the idea of reflecting values? Were projects that reflect a controversial issue chosen? Was subjectivity involved?

As we have seen, government funding is overall a healthy concept, yet in fact, the government does have an ulterior motive, such as the preparation for the year in which Valletta becomes European Capital of Culture in 2018. However, such motives can be accepted except if an imposition on the creative outcome is enforced (Hart, 1984).

The way towards sustainable creativity

A quality creative economy needs to be supported by quality education which nurtures the creative minds of students, ranging across the curriculum from kinder to higher education as a means of enabling creative development. As indicated in Figure 1, talent is at the core of the CCIs' strategy for development, out of which stem a variety of job creations,

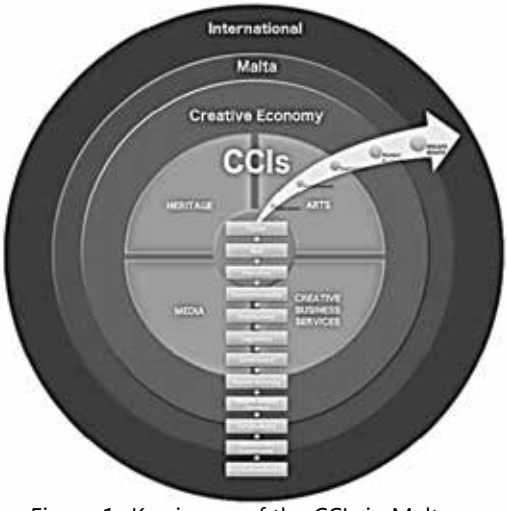

Figure 1: Key issues of the CCIs in Malta
(source: Creative Economy Working Group, n.d., p.24)

employment, sustainability and others (CEWG, n.d., p. 24, 25). Similarly, the European Commission emphasizes the point that everyone is creative and has the potential to combine their creative and entrepreneurial skills to "respond to new economic and social challenges" (European Comission, 2010, p.18).

An evaluation of the Kreattiv project reflects a change in attitude of the learning process; an attitude which goes beyond traditional practices of art for art's sake. Moreover, Kreattiv is an experience that promotes a more skilful and 'knowledge-based society' by giving the opportunity to learners to express themselves in multiple forms of art; an experience that deviates itself from formal teaching to one where the learning process is also valued.

Furthermore, the combination of education with CCIs is most effective when a 'creative partnership', similar to the partnership created in the Kreattiv initiative, is formed as a means of promoting creativity (European Commission, 2010, p.19). In fact the Kreattiv programme identifies the creative practitioner who, in actual fact, could be any person vocationally active in any major sector of the CCIs – Heritage, Arts, Media and Creative

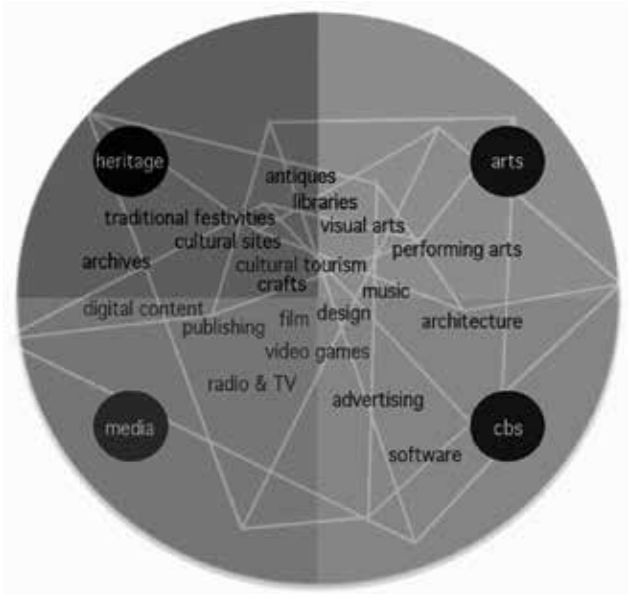

Figure 2: Creative Connectors
(source: Creativity Works, 2012 - Governance section 'Creative Connectors')

Business (Kreattiv Guidance Notes, 2011). As Figure 2 shows, although the sectors are theoretically separated, they are actually interconnected in several ways; for instance, in terms of creativity, competitiveness, services, economic contribution and innovation (Creativity Works, 2012).

Multi-profession partnership

In each Kreattiv project, a partnership is formulated consisting of a teacher, a practising artist/s, and students. Although a teacher can be a practising artist, his/her primary vocation is still that of teaching; therefore, for this article, it is important to distinguish the differing roles of teachers and artists. At the same time, it is not the aim of this study to analyse which profession is ideal to communicate art practices to students. By way of clarification it also needs to be pointed out that the artists involved were all active in various sectors of the CCIs, while the educators were not necessarily art teachers. In fact, Upitis (2005) discusses how similar projects are not meant to transform art teachers into 'art specialists' but are mostly meant to share experiences especially the differing approach to art from both professions.

As stated in the Kreattiv Guidance Notes (2011), the collaborative experience should be spread over a 12 month period. According to Burgess (1995), a 'residency' period where artists work directly and are engaged in the process of actually developing a work of art with students and teachers is considered as a long term involvement. Of course this is because the artists' level of commitment and dedication depends on the role taken during the artistic process of students' works and on the amount of time the artist is willing to share. Gradel (2001) distinguishes between four different types of artists' roles – that is, 'performing artist', 'interacting artist', 'collaboration artist', and 'master instructional artist'.

Burgess (1995) discusses the emergence of Artists in Schools programmes in America which was then followed by that in the United Kingdom. Voluntary partnerships can also result in interesting and effective collaborations. Such programmes are fundamental for a successful experience and many educationalists, such as Burgess (1995), agree with them. This notwithstanding, some educationalists expressed their disapproval of the programme itself, especially regarding the evaluation process of the projects; such concerns about the evaluation process were discussed for

example by Eisner and Vallance (1974). Robinson (1989, p.116) also noted that there were people who opposed the idea of having artists in schools; such people saw these programmes as "gross waste of rate-payers". It is hoped that this view has somewhat changed from the time Robinson carried out his research.

Furthermore, Nevanen, Juvonen, and Ruismaki (2012) refer to this partnership as a "Multiprofessional Collaboration" since both the pedagogic aims and artistic skills are essential targets of such programmes. This multiprofessional collaboration has been described as dynamic, active, and a developing process. Researchers attribute great importance to the division of roles and responsibilities of the professionals involved, especially in the planning, negotiations and decision making stages. Mutual dependence and mutual use of power are two attributes which also enable a successful professional collaboration that is based on trust, respect, and sharing of ideas rather than competition. Further to this, these same authors discuss the stages required for 'building cooperation' from the initial stages of agreement on the idea of the project, internalisation of the aims and objectives, and stabilising the idea through formal structures. Furthermore, they ensure that if commitment persists, the structure may become consistent, perhaps stable, within the learning environment (Nevanen et al., 2012, pp.5, 6).

Oddie (as cited in Cheung, 2004) mentions four different types of artist-teacher partnerships; these include: 'Supply-led' where the artist offers a product; 'Demand-led' where the school calls for a product or service; 'Overlapping agendas of interests' where school and arts organisations negotiate their respective standpoints; and, 'Dynamics dialogue' relationship open-ended and process of discovery and risk taking proceeds. Overall through the adoption of similar projects, educators can broaden their personal and professional contacts and provide valuable material for their students and school. Artists can also enhance their career possibilities (European Commission, 2010). In school, artists should correlate with the overall ethos of the school, such as beliefs and value systems but should not feel or be restricted by it. Their role is to stimulate students' creativity, enrich the experiences and ideas of students, while encouraging clarity in their expression of ideas.

Moreover, students not only improve their skills and experiences of creating art in context but improve other aspects that are associated with

Visual Culture Art Education. Similarly, Cheung's research on the above-mentioned Artists in Schools art education project shows that there were other benefits; for instance, the students' appreciation of arts increased, they gained an insight into the creative process as opposed to product, learnt skills of reflection, decision making, teamwork, and other personal and social skills (Cheung, 2004). The students were also motivated to work with different art forms as a means of enhancing their "social ability, concentration, communication" (Nevanen et al., 2012, p.8).

Challenging obstacles of AIS programmes

Artists in Schools (AIS) programmes experience a number of challenging obstacles that vary from the micro to the macro level of the school, such as, the behaviour of students to the supporting structure of the school and the restrictions handed down from the Education Departments, such as the Curriculum. Upitis (2005) and Nevanen et al. (2012) highlight a number of obstacles. These include difficulties in finding time to collaborate, communicate and plan strategies with teachers; lack of communication to discuss the different philosophies and approaches brought forward by the artist to teacher; working hours; hesitation, bureaucracy and, lack of clarity in the aims and objectives of the project; not enough risk taking students, fear of expressing themselves and timetabling. Artists believe that when they are given an indefinite time period to work in, they connect better with their inner self; however, time restrictions, such as timetabling, hinders this sense of 'ecstasy', with 'timelessness' resulting in an unfortunate state of having students not reach their full creative potential (Upitis, 2005, p.6). Upitis (2005) attempts to explore the experiences of both teachers and artists in two similar art programmes that were held in Canada and America. In this study many artists expressed several positive comments on their collaborative experiences. For instance, some admitted that they sharpened their skills as they felt they were back at school; incorporated school art studios structures and organisation into their home art studio environment, improved communication skills with students, exposed themselves to different art forms, empathised with the struggles that educators face on a daily basis, and became more patient and flexible. The study also shows that artists think that teachers are more interested in projects related to the curriculum. In fact, one of the artists expressed his frustration by stating how the "art world collided with the school world" (Upitis, 2005, p.6). Artists feel that factors related to Curriculum, such as,

assessment and standards, compromise this experience (Upitis, 2005).

One of the advantages of such partnerships is that the involved professionals can share faculties and resources, not just the physical ones but also the mental, for example, the spurring creativity of young learners. Undoubtedly, availability of time, resources and support from administrators are external factors that will positively affect the outcome of the project. Frequency of classroom sessions, rapport of teachers, and education of parents, also enable a successful product (Reynolds, 2004). Other factors that are required for successful partnering projects include common regulations from teachers and artists, lesson planning and having a clear distribution of work, roles and responsibilities (Upitis, 2005; Nevanen et al., 2012).

A new approach to teaching art

In order for creativity to be exploited in a positive way and so as for this to reach its highest potential, it must not be considered in isolation but intertwined with other disciplines and pedagogies so that it challenges inventiveness and entrepreneurship (Das, Dewhurst and Gray, 2011).

On the educational scene, the inter-relationship of two or more disciplines is frequently referred to as the interdisciplinary approach or more broadly as cross curricula. Many researchers (Das et al., 2011) regard this approach as a positive one especially since it often results in creating holistic experiences. Although the interdisciplinary approach is not as effective as traditional practices in terms of giving students knowledge on the subject, it "(emphasises) higher-order thinking (e.g. analysing, applying, generalizing) and seeks meaningful connections between and among disciplines" (Ivanitskaya, Clark, Montgomery and Primeau, 2002, p.97). The interdisciplinary approach allows students to learn certain skills and cognitive abilities that can be adapted and transferred to any unforeseen situation or career, even if the learner has never faced a similar circumstance (Hargreaves, 2000).

Similarly, "learning through the arts," allows for the use of artistic expressions as a means of learning other subjects (Bamford and Wimmer, 2006, p.18). Interestingly, the Canadian Learning through the Arts (LTTA) programme mentioned by Upitis (2005) incorporates art with other subjects while employing a holistic pedagogy. Although much has been said on the positive effects of the interdisciplinary approach, the artists in

Upitis's (2005, p.8) research have neglected to focus on the fruitfulness of an "education rich in the arts" but they mention that it had positive effects on the "attitudes and dispositions, physical and emotional knowledge, artistic skill development, and social cohesiveness of communities".

Moreover, the contemporary art world and school art are allegedly considered as distinctive worlds because the former is usually characterised by controversial, conceptual art while the latter is concerned with traditional themes and familiar materials (Jeffers and Parth, 1996; Efland, 1976). In fact, the function of art education is associated with humanizing students rather than understanding contemporary issues and theories (Jeffers et al., 1996). As observed in Nevanen et al. (2012), the collaboration of artists in programmes similar to the Kreattiv provides students with an experience to get to know the art world and to absorb the power, energy, and excitement generated from the arts. There are a number of ways how to bridge the gap between both worlds, such as, by visiting galleries and museums or going on fieldtrips (Jeffers et al., 1996).

Illich (1971) highlights the fact that the function of education was traditionally that of developing students' cognitive faculties. Efland (1976) attempts to challenge this view in art education by stating that art helps students become more human. Other researchers, such as Jeffers et al., (1996), Cahan and Kocur (1994), Grierson (2011) propose that art can be made more relevant to the public by "demonstrate[ing] how art can serve as a form of collective memory, individual expression, social criticism, and political struggle, as well as offering visual pleasure" (Cahan et al., 1994, p.26). Such researchers view art "as a catalyst for social change" (Cahan et al., 1994, p.27).

In spite of all the on-going changes many teachers still prefer to use examples that are "historically or geographically distant from the present day" and thus avoid questions associated with challenging the status quo, and power relations in society (Cahan et al., 1994). In fact, accepting to amalgamate both worlds depends highly on teachers' preparedness to integrate and to accept open inquiries into unfamiliar issues (Jeffers et al., 1996; Cahan et al., 1994).

A new approach to teaching art will eventually result in a new approach to seeing the world and ourselves. A learner-centred art education can help students overcome any existing complexities. In fact Grierson (2011, p.338)

argues that art educators should believe that art can reveal the world but they have to view art as a "site of knowledge"; a site through which art has multiple purposes, such as, art as a site of embedded concepts and intelligences; an archive of cultural knowledge, a relational site, creative thinking site, and a site through which humans reveal and form their selves. Furthermore, if teachers treat art as a cognitive faculty, they could be failing to work in line with the ideology of behaviourism where stimulus responses need to be measured and observed; or the taxonomies of Benjamin Bloom that reduced art to a mere 'affective' category (Efland, 2004). In the 1970s, this view changed because the term 'cognitive' expanded and included the creative and emotional aspects, as well as the intuitive (Efland, 2004). Gardner (1983) also contributed towards this idea that art and other faculties, the 'multiple intelligences' went beyond sequential intelligences and included cognitive aspects as well (Efland, 2004; Gardner, 1980). Eventually the instructional divisions created by Bloom's behaviourist paradigm, the cognitive, affective and psychomotor faculties were reunited into what is referred to as 'holism' (Efland, 2004).

Mind, body, spirit

The amalgamation of the mind, body and spirit is often the epitome of a holistic experience. In such learning environments, the whole person is challenged to a level that traditional teaching cannot reach. Previously it was noted that the interconnection between disciplines might lead to a holistic experience. According to McKenna's (2006) study, an exhilarated state of being is possible if art employs a holistic approach to education. This experience is deeply connected with our euphoric state of being; therefore, it is pure, meaningful and authentic. Educators must enable learners to develop and possibly transform their personalities to create a holistic view of the world and the needs to work within that world (McKenna, 2006).

Akin to this line of thought, McKenna (2006) proposes a three-step model approach on which one can develop a holistic learning experience for the students (Fig. 3). The first step is to consider the three elements that create the whole person. The 'mind' encompasses not only reason but also memory, awe, fantasy, wonder, intuition and dreaming. The 'body' includes sensory experience and dexterity, control, endurance, balance and tone, whereas the 'spirit' is "whatever resides enduringly at the core of our

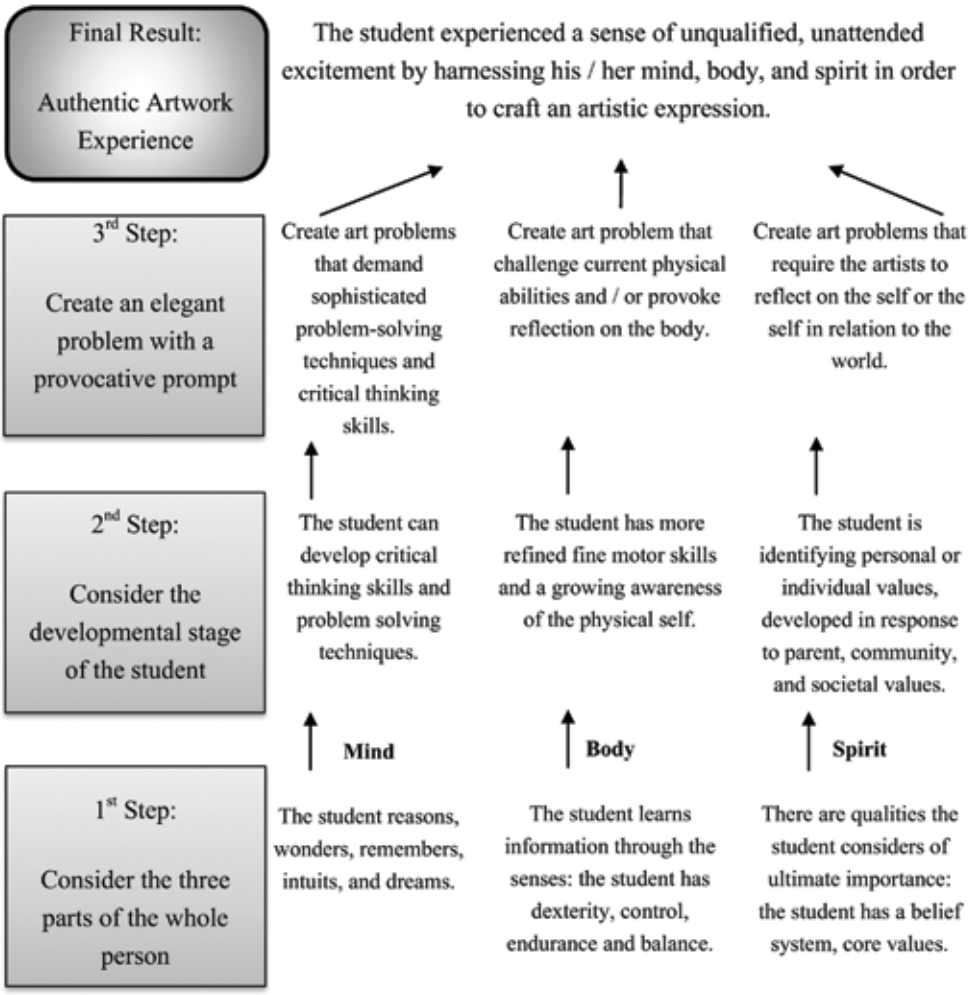

Figure 3: Holistic approach to teaching art (McKenna, 2006)

belief and value system" (London, 2006, p.12), the "deeper and intuitive aspect of human nature" (Campbell, 2006, p.29). While spirit opens up "new dimensions of reflection, prophecy, and possibility", it too "aspires towards wholeness, seeks connection, pattern, [and] circumference" (Abbs, cited in Campbell, 2006, p.30). Abbs (cited in Campbell, 2006) continues that the spirit helps humans reach their highest potential, including any goals related to integration. Therefore, integrated within the lesson, the meditative, intuitive, reflective aspect of the spirit, allow learners to discuss and reflect on societal factors, such as politics and inequalities, while empathizing with others. However, if the learner does not present his whole being; his mind, body and spirit, in the discussion, he may not be able to engage holistically (London, 2004).

The second step towards the creation of a holistic learning milieu relates to the actual school environment, which incorporates culture, value systems and religious beliefs as key tools that educators may utilise towards the creation of successful holistic learning experiences (McKenna, 2006). The third stage is directly related to the creation of the activity that will challenge the holistic student approach. McKenna calls this an "art problem" which is both elegant, and provocative. In fact, McKenna asserts that, "an elegant problem is one that is flexible enough to provoke students at different developmental levels, that elicits diverse solutions from students to elaborate on and personalise their artistic response" (McKenna, 2006, pp.54-5). Carroll (2004) and Carlos Castro (2004) refer to this as a 'self-referential problem', more specifically an 'existential question'. Carlos Castro (2004) argues that a provocative question challenges students if it is related to their own experiences thus inspiring something meaningful and authentic. McKenna adds that, "an authentic artwork or art-making experience is therefore one that is more representative of the young artist who made it, not the teacher who provoked it" (McKenna, 2006, p.55).

As noted above, one of the educator's roles is to ease the process of knowledge for students. The Socratic Method (Gradle, 2009) enables this process through its questioning strategy by which an instructor draws knowledge from the student. This method was also used by the late Henry Schaefer-Simmern, an art educator whose unique pedagogy seems congruent, yet somehow different, with holistic approaches; in fact, his student, Abrahamson, states that Schaefer-Simmern used "to challenge, lead, suggest, inform, and encourage discovery and self-evaluation" through a series of self-discovering questions (Gradle, 2009, p.8).

Holism can be understood as a set of skills that can affect abilities but also other components of human development. In fact, Abrahamson asserts that, "artistic formation frequently shaped behaviours, personality, and even dress of individual" (Gradle, 2009, p.16). Some may argue that artistic maturity is achieved once the artworks reflect artistic ownership of meaning, feelings and emotions (Carroll, 2006; Upitis, 2005). On the other hand, some may take the ideas presented by Schaefer-Simmern regarding the teacher's approach, giving more importance to the gestalt formation of the images before having the 'psychological' interpretations dictating learners' artworks. Simmern's goal was to help students become independent evaluators of their own artworks (Gradle, 2009); thus, the teacher used to question students to help them develop the image itself before they could form its meaning.

Carroll (2006) chronicles the evolution and development of holistic approaches towards enabling transformative learning, which results in reflection and discussions. Here, development refers to the growth of knowledge that will enable "transdisciplinary thinking" (Carroll, 2006, p.23). Educators can teach without attempting to find meaningful connections between different disciplines, different aspect of the human being, with different topics; that is with no wonder, awe, intuition or fantasy. However, one cannot then expect students to neither wonder, nor sense, nor fantasise. For humans it is natural, even biological, to criticise, adapt, respond, and reason, because the human cells constantly work in this way, such as responding to reactions, or adapting to different environments (London, 2006).

In the history of art, artists like Wassily Kandinsky, Paul Klee, and Johannes Itten, achieved simplicity from rather complex subjects. They did so by combining different multiple intelligences with art; eventually, their 'artful mind' which is considered a holistic mind, helped them achieve harmony in their works of art (London, 2006). This is evidence that through art humans can cultivate the "deeper dimensions of ourselves" (London, 2006, p.12), and possibly attempt answering questions such as, Who are we? Why am I here? Where are we? Questions which everyone is interested in, especially so if a holistic practice is used because now they become topics, which matter on a personal scale; even elementary school children are concerned (London, 2006, p.13). Thus, Holism is seen as spurring hope within learners to have a clearer vision of what surrounds them.

Undoubtedly, holistic education results in transformative learning, both from the teachers' and learners' point of view. Transformative learning is a 'structural shift' as it alters and expands the ways of how we use our mind, body and spirit in learning situations. It helps us understand ourselves, our relationship with others and helps structure our views regarding big narratives of justice, racism, gender, and others (Carroll, 2006). Simmern's approach was also transformative as he encouraged deep reflection in the learning process that altered the learners' thoughts. Transformative learning enables students to be active learners as opposed to passive learners (Gradle, 2009). Active learners are more experimental and critical when building new knowledge, solving problems, and experiencing new situations (Nevanen et al., 2012).

Adapting to multiple stimuli

The philosophy behind the Kreattiv scheme is to develop a learning context that will encourage different stimuli, such as curiosity, imagination, engagement and motivation. This learning context is possible if we create a 'safe climate' (McKenna, 2006), also known as "safe communities of learning" (Carroll, 2006, p.16).

"You are not here to prove yourself. You are here to improve yourself" (Wolf, 2004). This classroom motto by Wolf symbolizes the fact that Wolf's classroom was turned into a safe learning environment. This helped students improve in art, and as persons, they gained trust through transforming the atmosphere to one characterised by confidence, excitement, and sharing rather than judgements and comparisons.

The involvement of the spirit in artworks makes the subject of the work more sensitive. Nevanen et al. (2012) discusses how successful learning environment supports the cognitive, emotional and physical aspects. In such cases, any viewer that forms part of the environment, such as, teachers and students, must learn to respect and appreciate each other's works.

McKenna (2006) believes that this state is achieved when the teacher acknowledges the context of the students, such as socio-economic status and culture, and uses these to create opportunities of learning based on 'deep levels of meaning-making'. Finally, characteristics of holistic education, such as reflection, collaboration and integration will transform and alter the class dynamic.

The integration of teaching and learning creates a sense of community and is seen as a step towards holism. A sense of community between the students, teachers and artists can be created through a series of activities aimed at elevating discussions, critiques, and informal conversations. In such environments, students feel more comfortable to take risks and share personal experiences especially because judgement is not a characteristic of this learning situation. Meanwhile, students learn the right communication skills of listening, empathy, and speaking, verbally and non-verbally (Carroll, 2006, p.18). Other researchers such as Mayo (2007) extend their argument on the holistic notion of a community; therefore, involving the community, such as the parents, can contribute to the wider context of the holistic nature of the human being targeting aspects of culture, religion, and history. One can also reflect on how Kreattiv's outcomes might change if the programme allowed parents to participate as well. Would this relationship underpin a sustainable and contemporary society? Mayo's (2007) views are based on the works of Paulo Freire (1970) and other proponents of critical pedagogies. Mayo (2007) views parents as subjects, creators, and resources that can be valuable elements in the process of democratizing and transforming schools into communities of learning.

The community outside that of the school is also an essential part of an artistic experience especially when an artistic experience is intentioned to be exhibited in front of an audience, thus requiring the support of the audience (Upitis, 2005). Holism flourishes in the community also because it aims to understand bigger notions of the world. In fact, complex concepts of self and community through holistic art practices are put apart, and then reorganised in a way that make sense (Carroll, 2006).

The Creative Manifesto

Is Creativity a skill or a talent?

For decades creativity was considered as a one-off talent; however, contemporary views acknowledge creativity as a skill (De Bono, 1970) and as a form of intelligence (Robinson, 1989; Eisner, 1992; Efland, 2004; Gardner, 1983) which can be developed and learnt like other skills. Creativity is becoming more of an essential ingredient for transformation, rather than a mere component of aesthetic sensibility and expression for emotions, characteristics that are usually justified in the art world (De Bono, 1970).

In order to meet 21st century challenges, educational policies around the world are being reframed so that every policy includes a creative aspect. This emphasis on creativity is becoming evident in global education systems as well as in the business sector; in fact, creativity is considered as the most important leadership quality (Das et al., 2011). This refreshing view has superimposed (mostly in theory) the emphasis of logical sequential thinking, especially in the field of education (De Bono, 1970).

Numerous researchers discuss the concept of intellect in the learning context. Craft (2000) deliberates on the relationship between creativity and the domains of intelligences. Craft states that exploration and expression in our thinking processes can be provided through the incorporation of different types of 'multiple intelligences' (MI). These MI can be physical, emotional and social. On similar grounds, Eisner's views on mindful engagement are based on symbol-processing which uses the senses as origins for different experiences; thus, making Gardner's MI an important asset as some things need to be expressed in different forms of representation (Efland, 2004). Craft (2000), like Gardner and Csikszentmihalyi (1988), also views creativity as a form of intelligence; however, Craft criticises these two authors for lacking holism in their too 'intellectualist' approach towards the intelligences. Furthermore, Craft (2000) discusses how one must make sure not to relegate creativity to a mere functional skill that serves an intellectual purpose.

To conclude, the logistic way to achieve transformation is by inputting creativity in interdisciplinary and holistic practices. However, educators must explore ways and re-arrange information to find their own method as to how to become holistic practitioners, rather than follow the vertical, obvious approach outlined in various educational reports or journals. In fact, De Bono (1970) puts forward the importance of individuals having the possibility to explore new lateral thinking processes that allow the individual to use "information to bring about creativity and insight restructuring" (p.7).

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Geography as a school subject

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Defining Geography

The study of Geography incorporates various aspects through which students can discover and become captivated by the changing world around them. Geography has various facets that enable learners to investigate topics and themes ranging from the human sphere, which focuses among others on forms of economy and types of societies, to the physical environment, which looks into features that include volcanoes and earthquakes where one can explore the relationship between the various fields. Basically described, Geography as a subject entails how people and the environment interact with each other and the effects this leaves on our world. The relationship between the human and the natural phenomena has always been an aspect which stimulates interest in students to explore the reasons behind the interdependence between them. Furthermore, it offers pupils an opportunity to analyse appropriate responses in any type of situation (Miles and Ward, 2008).

The US Geography Education Standards project 'Geography for Life' explains that "Geography is the science of space and place on Earth's surface" (Bednarz et al., inGerber and Williams, 2002, p.2). This project discusses how these phenomena make up the various environments and places. The students' and the teachers' goal is to understand the meanings and interactions behind the physical and the human occurrences. Both ambits share a common factor, that is, both are 'theory-laden' (Rhoads and Wilson, 2010, p.39). The concern regarding the impact of nature with society shows the obvious connection between the physical and the human worlds. However, there have been observations and spatial analyses on the impact of human actions on environmental change and land use.

As Wilbanks (quoted in Gerber and Williams, 2002, p.1) has put it:

> *"Any academic is a means, not an end. It is a means for such intellectual ends as learning, knowing and understanding. It is a means for such social ends as progress and problem solving. It is a means for such individual ends as opportunity and fulfilment."*

Geography has been around for many hundreds of years. It incorporates three means: knowledge, value and skills. Peet (in Gerber and Williams, 2002) explains how these 'orientations' are combined together in the discipline of Geography. He states that the subject constantly alters and

transforms society and the natural environment resulting in a "complex natural-social landscape" (p.1).

The importance of Geography Education

"To 'learn geography' is to gain in power to perceive the spatial, the natural, connections of an ordinary act…"(Dewey, 2013, Ch. 16).

Why is Geography an essential subject to learn? Through Geography students acquire and develop the skills of questioning the processes and events which occur in their everyday life. Furthermore, it encourages them to think critically while tackling issues which are affecting people's current lives as also those of future generations – for example the human impact on the environment such as deforestation, or how a physical disaster such as a volcano eruption may destroy villages and other habitats. They adapt a sense of spatial understanding through maps, Geographical Information Systems (GIS) and other technologies, enabling the students to appreciate and be *au fait* with the constant transformation of spaces, places and people (Department for Education, United Kingdom, 2013).

Therefore, the nature of geography can be defined by place, space and the environment. *Place* describes the processes, systems, and inter-relationships that create or influence the locations of the physical and human features on Earth. *Space* tries to understand the relationships between places and people's activities in utilising the physical surroundings where they live. The study of the *Environment* incorporates the physical and human dimensions and addresses resources found on Earth and the impact on social, economic, political, and cultural consequences as also on other human activities (Unwin, 1992; Jones, Jones and Woods, 2004; Hubbard and Kitchin, 2011).

Scale is another factor included in Geography. It encourages the student to value different hierarchies: from personal and local to national and international up to a global dimension. These hierarchies influence the way students experience and understand how these scales interconnect. In addition, scales help students to study about themselves as persons living within a community and a society and this leads to them understanding better the cultural diversity existing in their country and in other places. This primes them to investigate how their past has led to the lifestyle they have adopted today (Department for Education, United Kingdom, 2013).

Children develop a sense of awareness by watching television, reading, travelling and playing. They utilise these understandings to create a mental map, to organise their activities, and to move from one place to another. "Children learn best when they deal with the real world – people, natural materials, problems to solve, their own creation" (Holt, Kamil and Seefeldt quoted in Gafà and Sultana, 2011, p.12). Students would come to school with the knowledge of "the face of the earth and about what takes place on the face of the earth" (Steiner, 2000: 143). These perceptions, knowledge and skills are refined at school through Geography and assist the students to broaden and improve their personal geography as they investigate and discover the interdependence and patterns between phenomena. Televisual resources enable students to bring places and global issues into the classroom (Kent, 2002). In addition, students can combine graphics, commentary and diagrams to facilitate the understanding of complex issues (Butt, 2002).

The teacher's role in Geography should be to encourage the curiosity of students about issues such as people's lives, and geographical local and global processes and patterns. This engages students to "...investigate, debate and evaluate their perspectives, values and ideas about the places in which they live and visit in considering their futures" (Catling, 2011, p.27). Summing up, the previously mentioned statements provide diverse aspects of Geography Education:

- The relationship between the physical and the human phenomena and their impact in particular areas in the world.
- The influences of place and location.
- The use of varied tools and techniques to collect and analyse data and represent geographical information.
- The practising of environmental and social values, developing their skills as geographers.

Geography can be approached either from a social point of view or from a scientific approach. Either way, Geography is a powerful tool to understand the contribution and appreciation of people and the natural environment and to safeguard sustainability to keep the world 'just' and 'pleasant' (Gerber et al., 2002, p. 9). "People operate at the personal, social and spatial dimensions to evaluate the ways that they live, and to understand the impacts of their practices at different scales for other people, places and regions" (Gerber et al., 2002, p.10). Therefore, students can appreciate how

people understand and interact with the world they live in. According to the Interim Report (Rawlings and Daugherty, 1996), geography education should:

a. Stimulate the students' interest in everything that is around them.
b. Foster in the pupils a sense of wonder in both the physical and human phenomena.
c. Develop a sincere concern about the sustainability of the environment and its impact on future generations.
d. Enhance their sense of obligation of caring for the Earth and the people living on it.

Geography Education and Pedagogy

Notwithstanding that the National Curriculum Framework and the Maltese curriculum have provided a level of standardisation in geographical content and its aims, teaching Geography still "remains a personal activity" (Balderstone, 2000, p.113). This means that Geography teachers still have the space to be autonomous in selecting various teaching strategies and learning activities. Slater (1987) states, that the teacher strategy applied in the classroom is "as important as selecting content" (p.55). Thus, as mentioned earlier, teachers are still finding their way with regard to the setting up of learning activities and of making use of different strategies, developing their knowledge of teaching, and learning processes (Balderstone,2000).

To be able to implement the various teaching strategies, teachers must apply pedagogy. Watkins and Mortimore (in Balderstone, 2000, p.114) define pedagogy as: "any conscious activity by one person designed to enhance learning in another". This description catches the essentiality of the relationship between teaching and learning. In fact, Anthea Millet, former Chief Executive of the Teacher Training Agency in England and Wales, and a Geography teacher, observes that, "I am always struck by how difficult they find it to talk about teaching … They prefer to talk about learning as if there is no relationship between the two" (in Goudie, 2000, p.4). To become an "effective pedagogue", Hallam and Ireson maintain that the teacher needs to obtain "a complex body of knowledge, extensive practical skills and the means of evaluating them" (in Wood, 2000, p.88).

An effective teacher must develop a wide range of teaching strategies to apply in diverse situations, therefore achieving several learning outcomes and promote varying learning styles. Students like different teaching styles; therefore the geography teacher needs to understand how these strategies and styles are essential to create a student-centred educational environment. Furthermore, the teacher has to identify how diverse strategies produce different mental activities which "bring about learning in the subject" (Balderstone, 2000, p.125). As Dewey has argued:

> *"[the] educational process has two sides – one psychological and one sociological…. Of these two sides, the psychological is the basis. The child's own instincts and powers furnish the material and give the starting point for all education…. Without insight into the psychological structure and activities of the individual, the educative process will, therefore, be haphazard and arbitrary. If it chances to coincide with the child's activity it will get a leverage; if it does not, it will result in friction, or disintegration, or arrest of the child's nature." (1897, p. 77)*

Wragg defines 'teaching' as, "whatever teachers do to ensure children learn" (Balderstone, 2000, p.125). The author gives five categories of teaching strategies which are:

- Telling and explaining
- Discovery and invention
- Teacher's questioning techniques
- Feedback
- Group work

Balderstone (2000) has proposed groups of strategies of which the following are considered as standard but which may be applied quite easily to Geography:

- Exposition
- Questioning
- Collaborative strategies
- Games, simulations and role plays
- Values education strategies
- Problem solving and decision-making
- Developing thinking skills

These points attempt to gather the "important principles guiding the effective use of different teaching strategies in geography education" (Balderstone, 2000, p.126). The above points serve as guidelines for trainee teachers yet more research is required to explain the various strategies used by the teacher in the Geography classroom. Roberts affirms that "geography teachers need to understand how and when they can use different teaching strategies effectively" (in Balderstone, 2000, p.127).

Resources in the classroom

Education has been changing and so should the type of resources in the classroom change with it. The traditional teaching method of 'chalk and talk' provided a formal teaching environment leaving little opportunity for the students to be active and to participate in their learning. The lessons are no longer teacher-centred but are more focused on the student, a situation which, with the help of resources, will "inject the interest and curiosity, make possible variations of teaching methods" and provide "stimuli for the fantasy world of students". This helps the class to explore "research techniques making it easier for students to pursue self-instruction… [and] add clarity and precision to the way the lesson is presented" (Borg, in Cassar, 1989, p.3).

Geography is multifaceted and therefore requires the support of a variety of tools to enable the teacher to make the subject more comprehensible for the student and turn something abstract into one that is more concrete. Therefore, teachers must learn how to utilise and manage the always-changing resources and technology and apply them in the classroom. Bill Sheskey writes:

To make authentic connections with students, we must change our strategies to reach this new generation of students. With the resources available today for use in the classroom, such as interactive software, digital imaging, audio and video creation tools, on-demand video libraries, computers and LCD projectors, and Web 2.0 tools, the hardest job may be choosing which media to use and how to integrate this into the classroom structure. It is the greatest time in history to be in a classroom because learning technology is changing at an exponential rate, and our students can thrive with it (in Blackboard, 2010, p.1).

Sheskey is not alone in underscoring this reality; educational practitioners

and visionaries agree that these technologies and a quality learning environment are essential for the child to succeed in today's world. A classroom which employs technology is considered a high performance learning environment as it enables students to access learning information, and teachers to teaching material such as content, training, and other tools and support. These enhance effectiveness by using both school-provided and personal technology improving the students' levels of achievement and the teacher's efficacy to deliver the material. Pam Willingham, a National Board Certified Teacher on assignment for Applications Training at Volusia County School District in Florida, has observed that,

> *"Our teachers know how to use our technology so they can spend more time with students. Their frustration is reduced and our technology investments are more productive. We've also seen that shared document creation means less teacher prep time, more time with students, and a more interactive, engaging classroom experience." (in Blackboard, 2010, p.2)*

Information and Communications Technology

Students can engage themselves through the use of multimedia content such as blogs, journals and articles which extend learning outside the classroom. This is also beneficial to the teachers as it provides for a flexible, online development, enhancing the classroom experience through strategic online planning (Blackboard, 2010). For the teacher to be able to do so, s/he must become a learner so as to keep abreast with the constant changes. Teachers must keep up with the technological innovations which help them assess their role in the classroom and to review the best strategy by which to engage their students. As Laurillard has argued, "our essentially 19th century model of educational institutions does not scale up to the requirements of a 21st century society" (in Pullicino, 2012, p.8). However, it is not enough for geography teachers to recognise that this technology exists but they need to adopt it and implement it in the classroom (Pullicino, 2012).

Harrison et al. (2002) conducted a research whose results indicated that teachers who utilise ICT in the classroom had a positive attainment. The reason is the students are more motivated during the lesson regardless of gender and ethnicity. However, this also depends on the students' varying

socio-economic status as their environment at home affects the level of use of ICT. This technology offers students an opportunity to concentrate on their achievements which increase their motivation in learning (Genovese, 2011). Lee and Friedman (2009) agree on embracing a more constructivist approach which focuses on the value of technology as a toll for educating and motivating students.

One may ask how technology is relevant to Geography education. Lee and Friedman (2009) argue against the limitations of an approach to Geography without the use of technology and insist on merging technology and Geography to revitalise teaching methodologies. They further stress that, "rethinking current practices through the lens of new technologies can enhance both student learning and the value of Geography" (p.211). In spite of having a vast array of gadgets to make use of in the classroom, such as interactive whiteboards, projectors and digital maps, it is essential to have proficiency in using these resources. E-learning should change the attitude in the approach and thus enhance the quality of education and the learning experience. Therefore it should not be as Allen (in Gafà and Sultana, 2011) points out, "boring instruction for electronic dissemination". The challenge is to integrate such learning into the previously non-electronic educative structure.

The role of resources in the geography classroom

To fully utilise the resources during a Geography lesson, the teacher must organise the classroom to support the learning of the subject. As a subject, Geography is resource-based, yet, it is not given extra funding when compared to the other subjects in the curriculum, therefore the teacher and the co-ordinator must "maximise the impact of geography in the school … by setting high standards for geographical classroom displays" (Owen and Ryan, 2001, p.115). Units such as 'Restless Mediterranean', 'Life in the Sahara' and 'Map Detectives' appearing in the Geography Curriculum of 2010 of Maltese schools, provide the children with opportunities to gather knowledge of local, national and global aspects while using resources such as a map, an atlas or a globe (Owen and Ryan, 2011). Furthermore, for the students to develop locational knowledge, the teacher can also provide topics for discussion such as the choice of the Floriana Granaries for large concerts. Students will debate the reason behind the choice and will also look into further areas that are involved. For instance, transport has to be

provided for performers and the audience. Food stands are placed around the Floriana Granaries and this implies that money will be spent thus involving the economy. The topography is flat and the area is large thus making it ideal for a stage to be constructed, and a substantial number of people are to fit into the space to watch the show.

Not all of the resources are suited for all of the topics. As Gersmehl (2008) argues, while images can be presented well by means of a slide projector or a photograph, an overhead projector, or more aptly in today's reality, the use of PowerPoint Presentations, videos and the Interactive Whiteboard, would be more useful to present geographic materials. The reason behind this is that the projector enables the teacher to present visual material 'in real time' while explaining the theories orally. Moreover, it allows the teacher to prepare, create and add material beforehand and use the saved information for other classes. Additionally, the teacher can observe the students during the explanation and detect any problems amongst the class while it is dealing with complex geographical concepts (Gersmehl, 2008).

On the other hand, this does not exclude photographs and images from being used in the geography classroom. Satellite images and aerial photographs require careful interpretation and analysis. Therefore, these generate a "'sense of place' as well as conveying perceptions of different peoples and environments" (Butt, 2002, p.58). One must keep in mind, that students' visual literacy has generally developed substantially when reaching the stage of secondary school. Through Geography, students learn to interpret and analyse countless images which represent the world around them. These analyses will help the student to develop and assess which geographical features, patterns and processes to illustrate and photograph during a fieldwork trip, as they would have been trained to understand the importance of selecting imaging through Geography (Butt, 2000).

Traditional and digital resources

Studies have shown that the use of primary resources in the classroom have helped students to analyse facts from different perspectives. Documents showing geographical events and issues have, in some cases, been clearer than textbooks or other secondary sources. Reading a journal entry written

by someone who has experienced the event at first-hand may provide more information and insight regarding the interaction between man and historical events. Students become critical thinkers as they examine and draw conclusions from what they are reading. It is essential for the teacher to keep statistics and facts updated. The necessity to keep up-to-date is being constantly stressed even though statistics provided by various authorities may disagree, and thus make it harder on the teacher.

With the introduction of the interactive whiteboard and other technological gadgets, one may easily forget that traditional resources still have a place in the Geography classroom (Hawkins et al., 1998).

The Globe

It is vital to have a globe within reach during a Geography lesson. Its importance lies in its spherical shape and two-dimensional representation showing distortions and giving a more realistic perspective of the world. This will help students to minimise misconceptions related to the size and shape of the continents. In fact, to compare the area between Australia and Greenland, first it is measured on a Mercator graticule, then on the globe. This shows how accurate the globe is regarding scale, making it quite important in the Geography lesson.

Maps and the Atlas

Topographical maps are mainly used for map reading including grid references, conventional signs, scales, measuring distances, orientation and relief. Wall-maps may not be considered essential by all teachers but their contribution in Geography cannot be ignored. Their advantage lies in the rapidity to address a country or locality during a lesson providing the children with a clear idea of the place. For instance, taking the topic about earthquakes and those that struck Gujarat, India; with access to a map, the teacher can indicate to the students the location of India and where Gujarat is situated. However, if more detail is required the utilising of an atlas is then suggested. Atlases are considered to be of fundamental importance. They provide remarkable information and great detail. Nevertheless, as atlases are constantly being updated, in schools it does not make economic sense to replace the older edition frequently with a newer one. At the same time, nowadays, maps and atlases are easily accessible online. The Association of American Geographers (n.d.) provide a list of websites where one can access world maps. National Geographic (2014) and other organisations have access to a world map on their website.

Photographs and Geography broadcasts

The ideal way for students to observe landscape is through fieldwork, which helps them to experience surroundings at first-hand. However, this is not always possible. Thus, the teacher has to rely on photographs to represent subject-matter. To be suitable for classroom use photographs should be of high quality, and cover well the subject matter.

Television channels such as 'National Geographic' and 'B.B.C.' offer a vast selection of geographical documentaries. Besides at school, children should be encouraged to watch such documentaries and programmes at home as well. In the past, the problem with viewing broadcasts at school would have been the time-tabling, and the broadcasts' fixed timing. Nowadays, it is possible to record them beforehand without having the preoccupation of television availability and to fit the programme within the Geography syllabus.

Textbook

Each pupil should have his own textbook as recommended by the school authorities to ensure that s/he has the information needed to work more efficiently. Textbooks contain the chapters that incorporate information and set examples on a particular unit. Moreover, they contain "relevant texts, suggestions for personal reading, statistics, and subjects for practical exercises", adding that a disadvantage of textbooks is that "it gives the child the impression that there is nothing to be added" (Hanaire, 1965, p.147).

Conclusion

As has been seen, Geography is an interesting and important subject. Yet to be productive it needs to be given all the resources that can make it effective in class. As a subject it shouldbe presented in such a way so as topromote understanding and engender a sense of satisfaction through its acceptance by the students.

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The Potential of Rocky Beaches as Sites for Advanced Level Biology Fieldwork

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Introduction

The study undertaken discusses the potential of rocky shores in Malta as sites for Advanced Level Biology fieldwork. Its aim was to assess to what extent rocky beaches are already being used for this purpose and, through questionnaires and interviews, in post-secondary schools, it took into consideration the views of teachers and students regarding rocky shore fieldwork. It transpired that although all teachers believed that rocky beaches are potential sites for fieldwork, only one was actually carrying out rocky shore fieldwork. The teachers interviewed, except one, stated that relevant educational resources would encourage them to carry out fieldwork on rocky shores. Furthermore, the study revealed that many students incorrectly believed that rocky beaches are characterised by low species diversity, compared to other sites, highlighting the lack of familiarity with such habitats, and thus the need for exploration and promotion of similar areas as fieldwork sites. Rocky beaches along the coast of Malta were thus visited and assessed, based on their suitability for fieldwork. Five sites were ultimately identified as suitable for investigation by students. The educational benefit from fieldwork on rocky beaches was investigated and various field activities were devised. A website was created to make resources more accessible to teachers and students undertaking fieldwork in these habitats. Teachers favourably received these resources during testing.

The teacher and student samples

Questionnaires were done out with students, while interviews were conducted with teachers.

The respondents were from five out of the six post-secondary schools in Malta – the one left out was not offering Advanced Level Biology during the period of this study. The student cohort chosen was that from the second year as it was more likely that these would have already had fieldwork experience at post-secondary level. Out of the 172 questionnaires distributed, 128 completed questionnaires were returned. The sample represented 24.6% of all post-secondary students taking A Level Biology at the time of the study. The retuned questionnaires came from 43 males (33.6%) and 85 females (66.4%).

The number of teachers interviewed amounted to 10. Of these 8 were females and 2 were males. The sample represented 29.4% of the total number of teachers who taught A Level Biology during the time of this study.

Current status of fieldwork

In Maltese schools a substantial number of students take part in one to three fieldwork sessions at both secondary (95.3%) and post-secondary (99.2%) level. This goes to show that despite the fact that teachers mentioned several advantages regarding the carrying out of fieldwork, as one respondent went on to say: "I can see multiple facets to the utility of fieldwork" (Teacher B), they still tend to carry out very few fieldwork sessions. This local trend had already been noted in Malta by Aquilina (2010), and in Gozo by Mercieca (2011), and may be a result of the contradictions present in the syllabus. The syllabus indicates that: "Both laboratory and field work should form the basis of the course" (MATSEC Board, 2012). Yet, students still get full marks for their practical book if it is thorough and covers all sections of the syllabus, even if a fieldwork account is not present as "Fieldwork, if carried out, must be more than just an account of a field course" (MATSEC Board, 2012). It thus transpires that fieldwork is not compulsory for attaining a good grade, as no marks are specifically reserved for fieldwork.

This notwithstanding, teachers are still carrying out at least one fieldwork session as part of the Advanced-Level course, which indicates that teachers either think highly of the purposes of fieldwork or are uncertain whether or not this forms a compulsory part of the syllabus. What seems clear is that all teachers believed that the syllabus has the most prominent influence on the type and number of fieldwork sessions carried out (Barker et al., 2002). This view comes out of comments like: "In fact, now that the syllabus, the new syllabus, is going to deal with algae, I think that the rocky shore fieldwork should be very important" (Teacher H).

Considering that teachers mention 'Relevance to syllabus' both as a main concern (14%) and as an advantage (16%) of fieldwork, having algae as part of the syllabus will apparently encourage rocky shore fieldwork; as a teacher said: "Our syllabus does not really prepare our students to engage in that sort of environment [rocky shores] very much" (Teacher F). This

dependency on the syllabus is not only true with regard to teachers but also with regard to students who ranked 'Relevance to subject' (45%) as the second most important feature of fieldwork sites.

As the status of fieldwork is established by the syllabus, it is expected that requirements are indicated clearly, primarily to make both teachers and students aware of the number of sessions required for MATSEC examinations. In order to increase the amount of fieldwork sessions done, the syllabus should encourage teachers to organise these trips better, as fieldwork should be considered an essential element toward the understanding a subject (Williams et al., 1999).

Sites being used for fieldwork

Considering the relatively small surface area of the Maltese Islands a good number of sites, amounting to sixteen, have been used for fieldwork sessions. On the other hand, there is still a general tendency to visit 'traditional' and accessible sites such as Buskett (27.2%) and Argotti Gardens (10.1%). Low percentages were recorded for coastal sites, especially rocky beaches, with the most popular from this type being Ramla Bay (4.5%) followed by Selmun (1.5%), Fond Għadir (1.5%) and Baħar iċ-Ċagħaq (1.5%).

In spite of the fact that rocky shores are considered important (Teacher H), 70.3% of students have only experienced terrestrial fieldwork. A plausible explanation would be the lack of teacher training and experience, "as fewer teachers have outdoor experience and training themselves, they are less likely to venture outside and so the cycle continues" (Barker et al., 2002, p. 11).

A comparison of sites indicated that the more popular sites were those that cater for the study of more than one ecosystem, such as Baħrija valley (8%) which was chosen for the study of terrestrial and freshwater ecosystems (Teacher H). This can also be applied to coastal environments where students can explore both rocky and sandy beaches through sites, such as Ġnejna. Furthermore, terrestrial and coastal environments can be combined, so that students may note the adaptations required in both the field techniques and the observation of organisms in the two areas.

What makes a site suitable for fieldwork?

There are numerous purposes why a fieldwork session is organised and therefore the site chosen should have characteristics that make these purposes attainable. The most common purposes according to students are to 'Provide real experience' (65%), 'Doing something outside the classroom' (60%) and 'Learning practical skills' (56%). The latter objective is also mentioned by teachers as the primary purpose of fieldwork (23%), followed by 'Enhancing environmental awareness' (20%). This seems to indicate that both teachers and students focused on the practical aspect of fieldwork, as the purposes given differ from those mentioned by Nundy (2001) who emphasises the purposes of fieldwork as those of better recall of facts and developing skills, namely higher order thinking skills and interpersonal skills.

When students were asked to point out the adequacy of a site for fieldwork, 'Animal and Plant Diversity' (61%), 'Relevance to Subject' (45%) and 'Safety' (39%) were classified as the three most important factors. The importance attributed to these features was confirmed when it was noted that the most adequate sites visited were still lacking in 'Animal and plant diversity' (-12.5%) and 'Safety' (-4.9%).

Species Diversity

Local ecosystems host a range of species adapted to a particular environment, and students become particularly excited when they encounter a species, sometimes more so when they come across an animal species (Camilleri & Muscat, 2009). One respondent from the post-fieldwork feedback questionnaires stated that observing crabs was his/her favourite activity as he/she is not particularly fond of plants and algae.

It is important to encourage rocky shore fieldwork as this helps towards the students broadening their understanding of local ecosystems, including the flora and fauna found in the area. Sites are considered suitable for fieldwork when diversity is relatively high, as this increases student motivation, as was the case with one of the respondents in Mercieca's study who was ecstatic when a species was discovered (Mercieca, 2011).

Relevance to Subject

Fisher (2001) explained that fieldwork has become a 'privilege', as the main aim of a subject is changing to that of performing successfully in an examination. Considering that relevance to the syllabus is a common concern, the chosen site has to provide an environment which allows for the carrying out of fieldwork tasks. However, it is primarily the duty of the teacher to be flexible in terms of the syllabus, and to organise tasks that are pertinent to the topics and to other aspects of the subject. This implies that the type of site should in no way influence relevance to syllabus, as tasks such as sampling, statistics and ecology can be explored at any location.

Teacher D pointed out that "when it comes to identification it can be done practically anywhere". Regarding the SEC Biology examination it is revealed that "Candidates who were exposed to and actively engaged in practical work during their biology course gave better answers to the questions set in the written papers" (MATSEC Board, 2014). This highlights the importance of different types of practical work in learning the subject effectively. The implication of this for rocky shore fieldwork is that carrying out such an activity should help students in understanding certain concepts (such as the environmental gradient on shores) specified in the syllabus.

Safety

With regard to educational psychology, safety is one of the basic levels in Maslow's Hierarchy of Needs (Maslow, 1943). Students need to feel safe before moving on to higher levels of motivation and finally self-actualisation (McLeod, 2007). Both teachers and students recognise this element as it emerges from the degree of importance placed on safety.

Moreover, the only teacher who explained that she would not be willing to use rocky beaches for fieldwork indicated 'safety' as her main concern (Teacher C). Why rocky beaches? With the exception of cliffs, 90.5% of the Maltese coastline constitutes rocky beaches (Gauci et al., 2005). Although it is strongly indicated that subjects taught should be related and supported by local context and examples, rocky beaches are seldom used for Biology fieldwork, with only 29.7% students having experienced this environment. A respondent from the post-fieldwork feedback questionnaire stated that, despite the fact that these beaches are visited for leisure purposes,

especially during the summer months, he/she was still unfamiliar with the biodiversity found there, prior to the fieldwork.

Milestone experiments in science were carried out on rocky beaches (Hairston, 1989) and these sites have been used in countries such as the UK (Dillon et al., 2006) and Sweden (Aquilina, 2010). This study showed that all teachers in Malta believe rocky shores do have the potential for fieldwork; nonetheless, only one teacher was currently taking her students to rocky beaches during the period of this research and claimed: "they are the best sites to go to for fieldwork. I think it's the easiest option and it's the fun option as well. Students love it" (Teacher G).

Encountering 'Different organisms' (16%), 'Observing zonation' (16%) and being 'Syllabus-related' (16%) are the three most frequently cited advantages from the numerous benefits listed by teachers with regard to rocky shore fieldwork. Apart from these specific advantages, the purposes of fieldwork in general can also be achieved through rocky shore fieldwork.

Thus, fieldwork should not be restricted to terrestrial areas, as Teacher D pointed out: "The more diversity there is, in practical work, the better". Teacher G complied with this point, stating: "It's fun for the students and gives them different opportunities, rather than just the land exposure." It can thus be concluded that all teachers aimed at providing a holistic view of the local environment which, Lock (1998) argues, has a bearing on the adult life of a future citizen (Lock, 1998).

It is disappointing that coastal habitats are not utilised more often considering that Malta is an island (Aquilina, 2010) and that all teachers interviewed agreed that the local coast has great potential for fieldwork. Aquilina's (2010) study explains that fieldwork creates more interest in the subject and it thus should be included so as to encourage further studies in areas such as marine biology.

Topics linked

When asked which topics are best linked to rocky shore fieldwork, nine of ten teachers stated that there are several topics that can be explored through this type of fieldwork. The most commonly mentioned areas included classification, sampling techniques (including statistics) and ecological

studies. The latter, which appeared most relevant in both teachers' and students' perspective, allows for a holistic approach to biology as it can be seen as an umbrella-term for various concepts and theories, such as population studies, predator-prey relationships, adaptations of species and biochemistry of processes such as photosynthesis (Lock & Tilling, 2002). Slingsby and Cook (1986) present numerous activities that can be carried out on rocky beaches, as fieldwork allows for ecological concepts to be observed in real life (Jones, 1980). Ecology brings many units of the subject together (Lock & Tilling, 2002). Through careful review of the MATSEC syllabus (2012), it was noted that certain units (see Table 1) revealed areas for further exploration through fieldwork on rocky beaches, as these could be directly linked to this type of investigation and especially to the ecological relationships. Furthermore, the syllabus states that local examples should be provided wherever possible (MATSEC Board, 2012) and, presenting these through a fieldwork activity, makes students more likely to recall the examples given (Nundy, 2001).

Unit Title	
1.1	General Principles of Classification
1.2	Classification
1.3	Diagnostic Structural Features of different groups
1.4	The Animal Kingdom (Animalia)
1.5	Major Groups within the Animal Kingdom
1.6	The Plant Kingdom (Plantae)
1.7	The Major Groups within the Plant Kingdom
4.3	Transport in Plants
9.4	Floral Morphology
11.1	Ecological Concepts
11.2	Population Ecology
11.3	Processes in Ecological Communities
11.4	Ecosystem Ecology
11.5	Local Ecology
11.6	Ecological Techniques

Table 1: Units in the MATSEC AM Syllabus that can be linked to Rocky Shore Fieldwork

Possible barriers to fieldwork on rocky beaches

Barriers related to Logistics

The most obvious constraint to including two types of fieldwork (one of which being on a rocky beach) in the Advanced Level Biology syllabus is that of limited time. Teacher A from the teacher interviews states that carrying out fieldwork on a rocky beach "would require an additional practical session to the ones we already have, so we have to sacrifice one other topic. We have a lot of logistics then, to play around."

Three foreign studies, Fido and Gayford (1982), Kinchin (1993) and Fisher (2001), all depicted the issue of lack of time and timetable logistics as major factors that kept teachers from carrying out fieldwork. In fact, out of all features considered, the issue of time was the one that was found to be significant by all three studies (Barker et al., 2002).

From a local study by Mercieca (2011) it emerged that most teachers interviewed found fieldwork, along with preparations required to carry it out, to be time-consuming. Teacher F underlined that carrying out fieldwork on a rocky beach would entail extensive background preparation.

With regard to time, Aquilina (2010) correctly pointed out that travelling time in Malta was a negligible element when compared to most foreign countries and should not act as a barrier to carrying out fieldwork on novel sites. As for timetabling issues, residential fieldwork carried out during the weekend could be a plausible method to overcome this barrier.

Another issue related to logistics indicated by teachers is that of expense. This was stressed by that teacher from the sample who carried out fieldwork on rocky beaches and was mainly related to the inclusion of scuba diving within the session. This activity, however, is purely optional and, while enjoyable, it is not essential to the carrying out of a successful fieldwork on a rocky beach.

Lack of familiarity with site

Teacher D admitted that she / he was not very familiar with the site, while Teacher I pointed out that information on predominant weather – namely, the ideal wind conditions for visiting each site – should be included in the

resource pack. This suggests that many teachers are not quite familiar with rocky beaches, and are not trained to carry out fieldwork at such sites. One student respondent had even described a previous experience of a rocky shore fieldwork as poorly organised.

Another element that indicates teachers' lack of familiarity with the site is their concern with the relevance of rocky shore fieldwork to the current syllabus (11.8% of responses). Teacher H stated that rocky shores could be rendered very relevant with new additions to the syllabus that will include algae. However, they are actually already relevant in the current syllabus.

As pointed out above, there are several topics that can be connected to rocky shores, including Ecology, which makes up a significant part of the syllabus. This unfamiliarity with the site is further exposed through the study by Aquilina (2010) whereby rocky beaches were only listed as an 'activity', rather than considered as actual sites where fieldwork sessions may be carried out.

The fact that teachers are concerned about the relevance of rocky beaches to the syllabus also shows the tendency towards the compartmentalising of the subject: "This situation is worsened further by the fact that much of the curriculum content is now boxed into neat compartments or modules that reduce flexibility within teaching programme" (Barker et al., 2002, p.8).

It may be that unfamiliarity with rocky beaches is related to lack of teacher training. Fisher (2001) argues that if teachers had not carried out fieldwork themselves they were likely to be oblivious to the benefits fieldwork offered to students. It could be concluded, based on the apparent hesitation of certain teachers interviewed in this study, that since they themselves are not familiar with fieldwork on rocky beaches, they fail to see its potential benefits to students.

This issue could be relieved through the organisation of courses for teachers related to the carrying out of fieldwork on rocky beaches. One such course had in fact been organised by the Department of Biology of the University of Malta, for 27 teachers in 2011, during which both shore and terrestrial sites were visited with the aim of equipping teachers with the skills needed to successfully organise and carry out fieldwork (Field biology course for educators, 2011).

Concerns about safety

The present study revealed that both students and teachers were concerned with safety, an element that was seen as a barrier to rocky shore fieldwork. Such preoccupation is related to the uneven and slippery surfaces caused by the presence of macroalgae (Little & Williams, 1996). One teacher pointed out that problems envisaged were related to the danger that students could fall on sharp rocky beaches and get hurt (Teacher C). The propensity to feel afraid of such occurrences is made worse by society's seemingly being unable to accept that accidents can simply happen and instead seeks someone to blame. This places the teachers under great pressure (Barker et al., 2002).

It is good that some teachers cut such preoccupations down to size and continue with their work. As Fisher (2001) has observed, it is because such salt-of-the-earth teachers exist that the education system did not suffer too much. It is however clear that many teachers, while genuinely wishing to carry out fieldwork get discouraged due to safety issues. In fact, this was one of the main concerns for teachers (26.7%), with Teacher C stating that she was wary of even considering it due to the safety hazards associated with rocky beaches. On the other hand, Teacher D did not consider safety to be much of a limiting issue with post-secondary students, stating these were more mature than younger students. The questionnaires in fact showed that 59.6% of fieldwork on rocky beaches was done by post-secondary students, while 40.1% was done by the younger secondary classes. Perhaps it may be recommendable that fieldwork on rocky beaches is initially made compulsory at post-secondary level and then, after further consideration of health and safety issues, it would also be considered for secondary school students.

There are however possible solutions to alleviate the concern of safety associated with Fieldwork, especially fieldwork on rocky beaches, which seems to raise more concern, as was pointed out by Teacher F: "There could be more issues of safety". Firstly, training and risk assessment, such as the five-step risk assessment carried out in many schools in the UK (Bullard, 2010), could effectively minimise health and safety risks. Another solution is to introduce an insurance policy that covers teachers. In fact, Mercieca (2011) found that, while none of the teachers were aware of the possibility of an insurance policy for schools, they all agreed to the possibility. Furthermore, Fisher (2001) suggested that the excuse of

avoiding fieldwork due to safety risks could be eliminated by covering teachers with an insurance policy. This is something that can be considered by Maltese schools.

Lack of space and resources

One teacher (Teacher I) from the ten interviewed thought that lack of space could be a limiting issue, as Maltese beaches tend to have a narrow 'intertidal zone' (presumably referring to the 'mediolittoral zone'). On the other hand this was not considered a limiting factor by the other teachers, and Respondent A did not even seem daunted by the fact that there would be a large number of students, since they could be divided into small groups and distributed along the coastal area. Furthermore, a very wide mediolittoral zone is not really needed since it might actually be discouraging for students to carry out a very long line or belt transect.

As for shortage of resources, Rickonson and Britain (2004) pointed out that lack of facilities and curriculum materials might present teachers with further difficulties when it came to planning and performing fieldwork. In the local study by Aquilina (2010), it emerged that many teachers would consider carrying out fieldwork in novel sites if more resources were made available. Actually, Teacher G said that a resource pack for rocky beaches would be very useful and would make things easier for teachers and give students something to follow.

Concerns about inadequate species diversity

Species diversity was the main concern of students with regard to rocky shore fieldwork (32.8%); however, teachers did not mention it. This, along with the appraisal of rocky beaches carried out as part of this study, which showed there was ample biodiversity, indicates that many students are under the impression that species diversity on rocky beaches is low. One of the teachers (Teacher F) in fact stated that many students would probably not be familiar with the rocky shore habitat, which is probably why many students stated that species diversity on rocky shores is low (41.1% of the 34 students who thought rocky shore fieldwork would not be possible gave this as a reason). In support of this point, one of the students taken on site to test out the website that was being constructed to support fieldwork,

stated that while at first she / he thought the rocky shore fieldwork would be boring, she / he was surprised at how many species there were. Another student wrote that she / he did not know there would be so many living things in rock pools on the shore.

A study by Lock (1998) expressed disappointment regarding the lack of knowledge of many students related to examples of flora and fauna in different ecosystems. The same can be said about the considerable number of students who, in this present study, expressed their belief that there is low species diversity on Maltese rocky shores. Therefore, including a fieldwork on rocky shores might be necessary if we are to ensure that students are to be made familiar with the biodiversity present in the said habitats. Actually, Jones (1980) argued that studying rocky beaches could give students an opportunity to familiarise themselves with different species of plants and animals living in that particular habitat. It is worth pointing out that the MATSEC syllabus for Advanced Level Biology specifically points out, for various topics, that where possible local examples of flora and fauna are to be used. This implies that knowledge of local species would be of great help for the examination.

Students' views on rocky shore fieldwork

Suggestion of novel fieldwork sites

Students were asked to suggest possible sites for fieldwork that they themselves had never gone to with their class. It was observed that a considerable percentage of students thought of coastal sites that could be used. From the respondents, 33% of those who had experienced coastal fieldwork suggested coastal sites while 52% of those who had not experienced it also suggested coastal sites. Half of the students who had not carried out rocky shore fieldwork suggested coastal sites, this being a good number considering that they had never experienced it. This indicates that, despite having no experience they still recognise the potential of such sites for fieldwork, and would be interested in this area as a novel site for carrying out such a study.

On the other hand, 67% of those who had experience of coastal fieldwork did not suggest a coastal site. This could be due to their not knowing of any additional suitable sites other than the one used, or it may be due to

their being dissatisfied with their previous experience. It could also simply be that at the time of completing the questionnaire they did not think of any suitable coastal sites.

Thoughts on carrying out rocky shore fieldwork

The majority of students thought that it is possible to carry out fieldwork on a rocky beach successfully and they would be willing to do it. In fact 95% of those who had experienced (age 9 to12) coastal fieldwork and 80% of those who had not, thought that it would be possible and stated that they would be willing to go there. Very few students considered fieldwork on rocky beaches as not possible and/or were not willing to carry it out. Furthermore, most of these had no experience. So, as Teacher F stated: "Maybe the students are not so familiar with that type of habitat... Maybe they never studied it before". From the respondents, 5% of those who had experienced coastal fieldwork stated that it would not be possible and they were not willing to go, mostly giving reasons related to safety hazards and presumed lack of biodiversity. One student stated that, "Past experience at Fond Għadir was not very enjoyable, [poorly-] organised and there wasn't much variety in flora and fauna". This suggests that rocky shore fieldwork that was organised was not effective. The fact that the student said diversity was low probably indicates that the field session did not take place at an ideal time or that there was no opportunity for thorough observation. It could also be due to lack of resources and teacher training, since the student specifically said that the field trip was not well organised.

Residential fieldwork on rocky beaches: a possibility?

In a comparative study carried out by Aquilina (2010), it was found that unlike in Malta, where fieldwork usually lasted a few hours, fieldwork in Sweden was normally carried out over a whole weekend, which seems to indicate that teachers in Sweden were ready to dedicate more time and effort into the organisation and performance of fieldwork. A local report on the teaching of Biology which came out in 1981, during which time Villa Psaigon in Buskett was already accommodating students carrying out residential fieldwork, proposed the setting up of another residential centre which would specifically cater for marine biology fieldwork. The reason given for this was that "the marine environment demands different

techniques for its study". Another remark made was that such field study centres are highly beneficial in promoting development of certain skills and values that are less likely to be taught inside the classroom, including "co-operation, conservation, respect for life and the social aspects of science".

Foreign studies, such as that carried out by Dillon et al (2006) have shown that longer fieldwork sessions are more effective for students. In fact, in the local study by Mercieca (2011), it was discovered that the majority of students thought that fieldwork sessions should be of longer duration, and these went on to suggest residential fieldwork. All four participants, who were taken to a rocky beach to test out the usefulness of the website, agreed that residential fieldwork would be very beneficial, giving reasons such as being able to get to know each other more, rendering learning more enjoyable, and having more time for activities.

Such studies seem to indicate that students would greatly benefit from the experience of residential fieldwork. Furthermore, this might solve certain issues with finding timetable slots since fieldwork could be carried out during the weekends, and lectures could be included.

Additionally, if there are issues with time and logistics, it might be possible to carry out fieldwork in more than one type of site, so rocky shore fieldwork could, for example, be combined with terrestrial fieldwork. Several facilities such as hotels and guest houses found near beaches could be used.

The Resource Pack: How will it help?

View of teachers and students on usefulness of the resource pack

All of the teachers questioned believed that the resource pack would (70%) or might (30%) be useful. One teacher, however, remarked that it would probably be useful for teachers, not students; and to not "expect students out of their own free will to refer to it" (Teacher A). This observation rather tallies with the fact that, while 57% of student respondents thought a resource pack would be useful, 36% were unsure and 7% stated that it would not be useful. One cannot put aside the consideration that this response may also be connected to their not knowing what the resource pack would actually include. Students may have been under the impression that the resource pack would be limited to printable hand-outs and

information, not being aware that this would also include activities and resources to be used during the actual fieldwork session (for example the species catalogue and identification key). Teacher B, who saw the website, in fact suggested that students are supplied with tablets or other mobile devices which they could bring on site so that they could have direct access to the resources. Furthermore, the layout of the website was designed so as to appeal to students, and the same teacher remarked that "it is user-friendly and layout is excellent and eye-catching".

Helping to minimise the novelty effect

First of all, the resource pack should be a tool which contributes towards the minimising of the novelty effect, since the novelty of a site does have a distraction potential (Falk et al., 1978). The resource pack should indeed help in creating a balance between novelty and familiarity (Dillon et al., 2006). The resources, specifically the information and the pictures of the site to be visited, and perhaps the species catalogue that would help students to familiarise with species which could be encountered, will prepare students beforehand, thus minimising distraction brought about by novelty (Cotton, 2009). In support of this element, Teacher D added that "on a website you can put anything to get familiar with the place, to get familiar with the study".

Helping to address the obstacle of limited resources

The resource pack will also be of help since one of the difficulties teachers face is lack of resources (Rickinson & Britain, 2004) - a limitation which may be putting off Maltese teachers from using new sites for fieldwork (Aquilina, 2010). The resource pack created was thus intended to address this limitation and encourage rocky shore fieldwork. Teacher A, who saw the website, observed that "It will definitely help both teachers and students because the information (photos, adaptations and all knowledge) needed for a specific activity are very clear. Both students and teachers will have access to the same information".

All four students who tested out the website while performing activities on a rocky beach agreed that the resource pack was useful since it made it easier for them to look up information while on site, and was faster than

using books. One student added further that, the fact that the website was about local sites and diversity made it especially relevant.

Mercieca (2011) also revealed that Maltese teachers had no field guides that could help them in the preparation of fieldwork, which was a drawback because they were only aware of a few fieldwork sites. This in fact could be the reason why many fieldwork sessions are still being carried out in the same limited number of areas. Furthermore, Teacher I noted that in order to plan a rocky shore fieldwork, teachers would need to know which winds are adequate for one site but not for another. The resource pack aimed at removing these barriers, since ideal sites for rocky shore fieldwork were included, along with a description which advised about the optimum and best avoided wind conditions.

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Cross-pollination in Teacher Development

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Introduction

Cross-pollination in teacher development is an under-researched area partly because of the in-service teacher training model currently in place in a number of educational contexts, including the mainstream school sector in Malta. At the start of the 2014-2015 scholastic year a group of 232 teachers working within the primary and secondary sectors benefited from an in-service course aimed at enhancing their language awareness. All Year III and Forms 3 to 5 English teachers working in state schools in Malta and Gozo participated in this course which was also attended by a number of teachers working in Church schools. The participants in this course numbered 120 primary teachers and 112 secondary teachers. The fact that the course was designed by twelve teacher trainers from the private English Language Teaching (ELT) sector specifically for the needs of mainstream teachers was its foremost innovative aspect due to the cross-pollination that ensued.

Teachers working in state schools in Malta are obliged to attend a minimum of twelve hours of in-service training every year. This training is either organised by Education Officers (EOs) or by the school itself. The training may focus on subject-related issues or else on other educational priorities. In 2014 there were four EOs responsible for teachers of English at secondary level and one EO responsible for the teaching of English at primary level. One of their main duties consists of organizing annual in-service training for teachers. In the case of primary teachers, training related to the teaching of English cannot occur every year as they might be asked to attend courses organised by the EOs responsible for other subjects.

In-service courses are not designed and delivered by the EOs every year. Besides the fact that sometimes teachers might have to attend training offered by the school where they work, the EOs at times invite guest speakers to run a specific course. For example, if a new course book were being introduced at a particular level the EOs would invite the publisher to send a trainer to Malta for the purpose of conducting a course based on the materials that the teachers would be expected to use in the forthcoming scholastic year. Despite the fact that external trainers have been used in the past, the seminal importance of the course discussed in this article is in relation to the fact that it indicates an alternative approach to teachers' in-service training in the mainstream sector.

The course was the brainchild of the Minister for Education and it was co-ordinated by the primary and secondary English EOs based at the English Language Resource Centre in Valletta. Knowing how much emphasis is placed on teacher language awareness in the ELT sector, the EFL Monitoring Board, the entity responsible for regulating this sector, was asked to help develop a course that would target this significant area in teachers' knowledge. Thornbury (1997) defines language awareness as "the knowledge that teachers have of the underlying systems of the language that enables them to teach effectively" (p.x). The link that Thornbury (1997) makes between language awareness and effective teaching is crucial and confirms the idea that a sound understanding of the English language, how it works and how students learn it and use it, enables teachers to exploit their pedagogical knowledge and skills more competently.

A pre-course questionnaire confirmed that around a third of the 232 participants had received little or no training in language awareness over the course of their career, the stress having usually been placed on methodology. The course was geared towards consolidating teachers' understanding of grammar, vocabulary, and pronunciation. In the case of the primary school teachers, there was also a focus on Content and Language Integrated Learning (CLIL), an approach that enables teachers to exploit their Mathematics, Science and Art lessons for the purpose of teaching English.

The course consisted of six sessions spread over three days, three sessions for primary teachers and another three for secondary teachers. Each session lasted four hours. The twelve trainers worked in pairs in order to design a session that they then delivered individually to three separate groups. Half the trainers were responsible for the primary level and the other half for the secondary level. In this way each group of teachers benefited from the knowledge and experience of three different trainers.

The three sessions of the course for primary teachers were called: 'Exploring Language Features and Giving Instructions through Various Tasks and Fairy Tales'; 'Mathematics in English'; and, 'Teaching Science in English'. The three sessions for secondary teachers were entitled: 'Practical Pronunciation'; 'Grammar Awareness'; and, 'Language, Literacy and Knowledge: Vocabulary as the Basis of Success'. The course consisted of hands-on activities that for the most part used loop input. Woodward (2003) describes this method as a "type of experiential teacher training

process that involves an alignment of the process and content of learning" (p.301). Hence, for example, whilst engaged in a pronunciation activity the teachers were also actively learning about how to teach a particular aspect of pronunciation. In this way the course also sought to reinforce their methodology through language awareness.

The cross-pollination between the private ELT sector and the mainstream educational sector posed a number of benefits and challenges. Based on the results of an interview-based study, this article explores the cross-pollination that took place as part of this professional development course.

Towards a Generative and Transformative Model

As mentioned above, the one-time, intensive INSET course model still largely dominates the kind of in-service training that teachers in Malta are offered. In the literature on professional development this model has been criticised as being insufficiently effective. Randi and Zeichner (2004) maintain that "teachers learn little from traditional in-service workshops and that they should engage in more experiential professional learning" (p.200). They claim that on such courses "the learning opportunities actually offered to teachers have typically been driven by others' visions of what teachers need to learn" (Randi and Zeichner, 2004, p.181). According to Hardy (2010) the traditional one-off approach to professional development hinders "more robust, localized, sustained and engaged approaches to teachers' learning" (p.80). He argues that, "The continuation of these practices within the field of teachers' work reflects sedimented traditional approaches to teachers' learning and the marginalization of more active learning in general" (Hardy, 2010, p.80). Avalos (2011) claims that "teacher learning and development is a complex process that brings together a host of different elements and is marked by an equally important set of factors" (p.17).

After having reviewed a substantial amount of literature on teacher development published in the first decade of the 21st century, she affirms her belief that "we have moved away from the traditional in-service teacher training (INSET) model" and come to recognise the fact that "prolonged interventions are more effective than shorter ones, and that combinations of tools for learning and reflective experiences serve the purpose in a better way" (Avalos, 2011, p.17). Underscoring the significance

of a generative and transformative professional development model, Flint, Zisook and Fisher (2011) affirm that "professional development models that are collaborative, learning centered, and related to practice are more meaningful to teachers" (p.1164). Moreover, "authentic professional development is voluntary, inquiry oriented, pervasive across time and space, and open to the complexity, range, and variation of professional development based on teachers' self-identified needs and interests" (Flint et al., 2011, p.1164). It seems clear that the long-established INSET training model in place in the Maltese context needs to be re-evaluated and if not superseded altogether at least complemented by a more generative and transformative model.

In the traditional INSET model teachers from a variety of contexts are usually brought together in one location to participate in a session led by a trainer who may no longer be an active teacher. The first risk here is that teachers do not have a say in selecting the focus of the training, which may thus be divorced from their needs. Nir and Bogler (2008) maintain that "when able to decide for themselves whether to participate in a particular professional development process or not, teachers are more likely to exhibit a higher degree of satisfaction with these processes" (p.384). In support of this de Segovia and Hardison (2009) argue that in order for the implementation of reform in ELT to be successful "Continuous feedback from the classroom to policy makers and ongoing professional development support are… beneficial" (p.161).

From research by de Vries, Jansen and van de Grift (2013) it emerged that "In a situation in which CPD is a professional duty and not mandatory, teachers' student-oriented beliefs relate to teachers' own learning activities or CPD" (p.86). This raises questions about the effect of mandatory INSET courses on teachers' learning and development orientation. Secondly, on such courses it might be very difficult to create a sense of collaboration amongst the trainees given their different contexts. Hence, teachers might feel they are operating in isolation, which compels them to employ familiar techniques rather than attempting to adopt a problem-solving approach in order to address contemporary students' needs (Gemmell, 2003).

Talking about a collaborative form of professional development, Stillwell (2008) claims that "it brings peers together to talk shop and tap into one another's experience, breaking down barriers and giving novice teachers a chance to learn from the pros, and vice versa" (p.361). Hadar and Brody

(2010) found that the "breaking of isolation included the creation of a safe environment in which sharing, daring, and support became commonplace" (p.1649).

The necessity of such a collaborative learning environment leads Postholm (2012) to conclude her extensive review of the literature on teacher development by saying that "the schools in which the teachers work are the best arena for them to learn" (p.425). This means that the "courses teachers participate in should be connected to development processes they are already participating in at their school" (Postholm, 2012, p.425). Kuusisaari's (2014) investigation into collaborative teacher learning during in-service training found that "collaboration that supports collaborative development consists of ideation, further development of ideas and raising questions" (p.46). Engaging teachers in collaborative forms of professional development in their own contexts and based on the needs they help identify is an intrinsic part of a generative and transformative model.

Another significant feature of the generative and transformative model of professional development is the importance given to teachers' identity and beliefs. Randi and Zeichner (2004) assert that "Professional development is not about learning to work more efficiently. As learning professionals, teachers are working to learn more effectually so that they may bring their knowledge to bear on the particular problems of practice" (p.220). This entails supporting teachers to perceive themselves as lifelong learners.

Ure's (2010) model of teacher education "helps create a learning continuum for teacher candidates that links the learning outcomes for teacher education programmes to the subsequent phases of teacher professional learning" (p.470). The idea of a continuum is crucial in the constructivist model of teacher development. Teachers' development from the pre-service stage to that of experience involves a series of incremental changes in beliefs and practices. For example, Ezer, Gilat and Sagee (2010) show how initially teachers will value "the contribution of the experiential component in teacher education…as more essential for their success as teachers than the theoretical one" (p.402). However, "Once they have gained experience, the theoretical knowledge of their subject matter and of auxiliary subjects will be perceived as significant to their functioning as teachers" (Ezer et al., 2010, p.402). It is this kind of transformation in teachers' beliefs that leads Kanno and Stuart (2011) to underscore "the centrality of the development of teacher identity in novice L2 teachers' learning-to-teach processes"

(p.249). According to Armour and Makopolou (2012) one of the main flaws of most professional development programmes is their "fractured understanding of teachers as learners" (p.343). They argue that if teachers perceive themselves as teachers rather than as learners there is the risk of stasis in their learning: "if teachers are engaged in impoverished learning experiences over a long period of time they are likely to become deskilled as learners" (Armour and Makopolou, 2012, p.344).

Antoniou and Kyriakides (2013) affirm that "Every effort to train teachers inevitably should refer to what an effective teacher is or how an effective teacher should behave in the classroom in order to maximize the learning potential of the students" (p.9). Partly for this reason, "managers of ELT innovation should first persuade the teachers of the need for change and the benefits of the proposed innovation, recognizing the dialectic relationship between teachers' beliefs and pedagogy" (Choi and Andon, 2013, p.19). The fundamental significance of teachers' beliefs in determining effective pedagogy means that professional development should seek to adjust teachers' beliefs about learning and teaching. The relation between teachers' beliefs and CPD participation was investigated by de Vries, et al. (2014) and these "found symmetry between teachers' student orientation and their own learning (a higher student orientation means higher participation in CPD)" (p.351). Such "teachers engage in professional learning first and foremost because they find it enjoyable, interesting, value it personally, and see it as important to their goals" (Jansen in De Wal et al., 2014, p.33). The generative and transformative model develops teachers' beliefs and their identity as educators who value professional learning.

Implementing a generative and transformative model of professional development is a challenging task that relies largely on the effectiveness of the trainers, who will need to possess a set of important attributes that will allow them to fulfil the potential of this model. One of Hayes's (1995) twelve principles for professional development stresses that "Trainers should themselves be teachers" (p.257). The advantage of this is that "Teachers on the course recognize that what they are being asked to consider is grounded in the experience of a colleague, and is not the abstract theory of a ministry official or university lecturer, far removed from ordinary classrooms" (Hayes, 1995, p.257). Such trainers will most often engage teachers in the kind of experiential learning that is deemed desirable in the classroom. According to Swennen, Lunenberg and Korthagen (2008)

"Teacher educators seem to agree that, to be able to support their student teachers' learning, they themselves should be good models of the kind of teaching they are trying to promote" (p.531).

In discussing the 'teach as you preach' principle in teacher education, Struyven, Dochy and Janssens (2010) state that "Rather than delivering information about engaging and innovative teaching practices through traditional approaches, modelling the use of these teaching methods serves the purpose of providing student teachers with 'experiences' of good teaching practices" (p.43). Such congruent teaching is not only important in pre-service training but should be a constant feature of in-service professional development.

Another important attribute is the trainer's context-sensitivity. This is necessary because "it will never be possible for the trainer to prepare trainees for all the contexts in which they work now or may work in the future" (Bax, 1997, p.235). Context-sensitivity "includes the attempt to involve trainees as far as possible in the process of their own development, which in turn means that their own views about their teaching contexts will probably be given prominence in the teacher education session" (Bax, 1997, p.237). Nonetheless, the trainer needs not accept everything teachers say unquestioningly; "challenging their assumptions and proffering new ideas will probably lead them to reflect more on their work than if they were left to express their views without an outsider's criticism or suggestion" (Bax, 1997, p.237).

Molle (2012) describes how a trainer's effort to "support collegial participation that is not focused on agreement but whose purpose is to interrogate ideas" (p.205) is typical of high quality professional development. The act of questioning is significant because, as Kuusisaari (2014) found, "excessive agreement during the process of collaborative development appeared to hinder, or even prevent collaborative action, and also suppress development of new teaching practices" (p.55).

In addition to the above, the most fundamental attribute that trainers need to possess is their own aptitude towards professional learning. According to Swennen et al. (2008) "The fact that the transition from teacher to teacher educator is assumed to be non-problematic suggests that the work of teacher educators themselves is neither particularly specialized nor highly valued" (p.540). Trainers "need to learn the professional language,

not only to enhance the level of congruent teaching, but also in order to learn from the expertise of colleagues, to reflect on their own teaching and to develop as teacher educators" (Swennen et al., 2008, p.541). Goodwin and Kosnik (2013) suggest that "In order to rethink teacher education, we must recruit and support teacher educators who have a broad mandate, an expansive world-view, a collaborative approach, and the skills to enact a rich curriculum" (p.343). Being able to use trainers with the above set of attributes facilitates the task of implementing a generative and transformative model of professional development.

One way through which this model can be implemented more easily in mainstream education is by embracing the idea that the sources of in-service training should be as varied as possible and hailing from different sectors.

In describing a collaborative form of professional development, Bignold and Barbera (2012) assert that "Teacher educators should be using all relevant, valid and reliable information that supports the professional education and development of students and the school workforce generally" (p.373). This is necessary because "the importance of establishing a collaborative learning culture as a catalyst for effective CPD and subsequent change should not be underestimated" (Bignold and Barbera, 2012, p.374). Bourke, Mentis and O'Neill (2013) claim that "An expansive view of teacher learning together with recognition of the benefits that may derive from freely renegotiated rules and divisions of labor may lead to unanticipated but ultimately more useful objects and artifacts of that learning" (p.276).

In line with this idea, Livingston (2014) declares that "A dynamic mix of 'teacher educators' is needed with different knowledge, skills and expertise. They need to work in partnership with the teachers and with each other in a more integrated and co-constructed form of teacher education" (p.222). This kind of integrative approach leads to a situation of cross-pollination whereby one sector helps to develop another.

The kind of cross-pollination in teacher development witnessed on the in-service course described above probably constitutes the spark of an effective alternative to the traditional INSET model. However, for it to be effective cross-pollination requires that teachers (and their superiors) trust the external sources of training. According to Wermke (2012, p.623)

> *"Teachers believe sources of knowledge are not equally important and this relative degree of importance is also dependent on the trustworthiness they attribute to those sources. Consequently, actors who are able to generate a climate of trust, characterized through competence, respect and understanding, gain access to the schools and therefore have better chances at influencing teacher practice."*

In Livingston's (2014, p.219) opinion,for cross-pollination to play a pivotal role in contemporary teachers' development, momentous changes need to take place first:

> *"The diversity of teachers' professional learning needs across their career calls for a collaborative approach to teacher education with different teacher educators working in partnership – integrating research and practice to promote innovation and improvement in learning and teaching. The development of an effective and sustainable collaborative approach to teacher education requires shifts in systems, cultures and practice and ongoing professional development for teachers and teacher educators."*

While it is important to acknowledge that professional development transcends face-to-face in-service training, it is also crucial to appreciate that the trainers used for such training should not necessarily originate from the teachers' own sector. Cross-pollination allows the knowledge, skills and experience developed in one sector to help enrich another. Creating a culture that values such "multi-layered interconnected approaches to teacher education" (Livingston, 2014, p.221) is fundamental if teachers are to benefit from generative and transformative forms of professional development.

Methodology

The findings reported in this article were generated by an interview-based study that investigated the cross-pollination that took place during an in-service course on teacher language awareness. Immediately after the course, semi-structured interviews were held with the five EOs co-ordinating it and with the twelve trainers responsible for its design and delivery. Each interview was held in a one-to-one manner, audio recorded

Education Officer	Gender	Years of Teaching Experience (years)	Years as Education Officer	Level
E01	F	19.5	9	Primary
E02	F	27	1.5	Secondary
E03	F	22	1 month	Secondary
E04	M	28	11	Secondary
E05	F	35	10	Secondary

Table 1 – Education Officers

Teacher Trainer	Gender	Years of Teaching Experience (years)	Years as Education Trainer	Level
TT1	M	35	22	Secondary
TT2	F	10	6	Secondary
TT3	F	11	5	Secondary
TT4	F	11	5	Primary
TT5	F	11	8	Primary
TT6	F	25	18	Secondary
TT7	F	6	1	Secondary
TT8	F	14	7	Primary
TT9	F	24	13	Primary
TT10	F	30	16	Primary
TT11	M	18	12	Primary
TT12	M	22	15	Secondary

Table 1 – Teacher Trainers

and transcribed. These interviews focused on the interviewees' views in relation to the cross-pollination in teacher development that had occurred as part of the course. Tables 1 and 2 provide further information about the EOs and teacher trainers (TT) respectively.

The tables above show that, with one exception, all the interviewees had plenty of teaching experience. Three of the five EOs had been in their post for an average of 10 years. Hence their knowledge of teachers' needs was considerable. The majority of the trainers had a minimum of five years' training experience, most of which had taken place in the ELT sector. However, in a few cases they had experience of training mainstream teachers in other countries.

ELT sector's contribution

The interviewees were asked what they thought trainers from the ELT sector could offer to teachers in mainstream education in relation to language awareness and methodology. According to the EOs,teachers can benefit a great dealfrom suchtrainers. In terms of methodologythe main contribution is their knowledge of innovative methods and approaches. One EO explained that "because ELT schools are a business they need to keep their clients happy. Possibly because of this they are a bit more au courant with more recent methodologies…perhaps they are willing to try out new things in order to be successful" (EO2). Her colleague agreed with this by saying that trainers "can contribute innovation because in the mainstream school classroom you're dealing mostly with teenagers and you've got to be innovative and fresh in your teaching otherwise you're going to lose their attention. There's always room for refreshing new ideas" (EO3). The trainers' innovative ideas enable them "to improve on teachers' methodology practices in the mainstream classrooms. I think teachers would appreciate that" (EO5). The CLIL activities the trainers carried out with the primary teachers as part of the in-service course are an example of this: "from the feedback I received the primary teachers enjoyed the cross-curricular aspect, using English in Maths and in Science. They found that quite interesting" (EO1). Another EO mentioned how ELT trainers can contribute ideas in relation to making language learning motivating: "Since certain students in the ELT sector, especially youngsters, might not be that motivated, these trainers are used to doing their very best to make their lessons as motivating and fun-filled as possible. That helps them to

share with our mainstream teachers all these best practices" (EO4). This interviewee also affirmed that "These trainers are used to employing differentiation methods because in the ELT sector they have to cater for so many different levels, age groups, and cultures" (EO4). The EOs indicated that mainstream teachers stand to benefit from the exposure to innovative methods and approaches that ELT trainers can provide them with.

The trainers agreed with the EOs that their main contribution in relation to methodology is their knowledge of what is considered innovative in language teaching. One trainer pointed out that "On a theoretical and practical level in our field there is a bigger emphasis on a learner-centred approach, and collaborative learning via pair work and group work… In our sphere the dominant methodology has long been a communicative methodology" (TT1). Trainers in the ELT sector try to "make language learning more motivating" (TT2) or show teachers "how to teach language in a fun way" (TT3).

One trainer affirmed that in ELT "we use more communicative and interactive methods and I think we are just a little bit more up-to-date with modern teaching methods" (TT6). A colleague of hers claimed that, "we can provide teachers with ideas in relation to the kind of methodology they could use to make language learning more interactive" (TT10). The trainers working with primary teachers indicated that, "we can help them when it comes to teaching language using a CLIL approach, which they didn't seem familiar with" (TT8).

However, teachers need to be willing to adopt such practices: "If the teachers are open to other methods then we can offer them a lot. I did notice that a few teachers are resistant to such methods" (TT4). The trainers acknowledged that this resistance might be due to the different contextual demands between the ELT and mainstream sectors. As one trainer pointed out, "the teachers were restricted because of the context in which they teach but a lot of them would have liked to be free to teach the way we do in this sector" (TT7).

Another trainer asserted that mainstream teachers "teach English to prepare students for exams whereas we do so to prepare students for the real world. So I don't blame them entirely for using certain methods" (TT10). The ELT trainers maintained that despite these limitations they could still help mainstream teachers to adopt a more learner-centred

and communicative methodology if they were receptive to the idea of improving their practices.

With regard to the enhancement of teacher language awareness, the EOs pointed out that trainers from the private language teaching industry are well qualified to conduct such training: "the ELT sector is geared towards that and teachers stand to gain from the knowledge of these trainers" (EO5). This is because in the ELT sector "language awareness is at the forefront, you concentrate on it all the time in order to be successful with your students" (EO2). Given their clients' language needs, "inevitably trainers from the ELT sector have much more language awareness because they actually have to do a lot of homework themselves in order to perfect their knowledge of the language" (EO4). This might not be the case with mainstream teachers: "especially in certain contexts, language awareness might take a bit of a backseat because there are other things to concentrate on" (EO2).

One EO explained that, "With regard to language awareness, some primary teachers might need that training…because perhaps they rely mainly on their secondary education. To be a teacher in primary you only need to have a SEC certificate in English and some teachers didn't go beyond that" (EO1). The EOs valued the trainers' prowess in enhancing teacher language awareness and it was partly for this reason that they accepted to collaborate in co-ordinating this course.

The ELT trainers concurred with the idea that the emphasis placed on language awareness in their sector makes them adept at delivering training related to it. One trainer stated that, "it would be helpful for the teachers if the metalanguage I have is passed on to them. Not all of them have it" (TT5). The trainers felt that "what we could give them is an understanding of how this knowledge helps them as teachers" (TT10). One reason for which ELT trainers have a well develop language awareness is that, "We teach students from different linguistic and cultural backgrounds and we are thus exposed to a wider variety of language learning problems. In a mainstream school you're largely exposed to the same problems. ELT teachers have to adapt to the needs of different learners and help students with their particular problems which are often linked to their mother tongue" (TT6). One of the most experienced trainers pointed out that in ELT "we accept language diversity. I think that many mainstream teachers only have one model of English and some of them may feel a bit inferior because of it.

Seeing this in a different light also helps in the analysis of language" (TT1). Somewhat in relation to this, a colleague of his remarked that, "in relation to pronunciation we have a lot that we can offer to mainstream teachers…

Our students have different expectations than Maltese speakers of English. Our students know that they need to improve their pronunciation. So in ELT we know we have to train our teachers to do that. It might not be done in mainstream education so I think we're very well equipped to offer that to them" (TT12). Language awareness training was considered "mostly necessary for the primary teachers" (TT11), who gave some of the trainers the impression that "they don't need it. They were like, 'We don't need this because we don't have to teach it'" (TT4). The trainers obviously disagreed with this idea, with one of them explaining that "When primary school teachers teach subjects like Maths, Science etc. they wear their subject hat. They go into the lesson and completely forget about language. So what I did and what they really took on board is the idea that you have to wear the language hat as well" (TT9). The trainers not only confirmed that language awareness is necessary for mainstream teachers but that the ELT sector has much to offer when it comes to training aimed at enhancing it.

Benefits of cross-pollination

When one educational sector helps to develop another,the educators on both sides can accrue a number of benefits. In the case of the in-service course, the participants could learn from a group of trainers who had become experts at the task of developing teacher language awareness. By designing and delivering a course tailor-made for teachers from a different context, the trainers could develop their own training skills. Nonetheless, all the EOs and ELT trainers indicated that the main benefit is that both parties in the cross-pollination process are provided with a new perspective on significant teaching and learning issues.

For the EOs, cross-pollination is a two-way process that enriches both mainstream teachers and ELT trainers. According to one EO, "Once you are open to the idea of cross-pollination both sectors would gain… I've always believed in going into something with an open mind to learn, in every situation you're going to learn something… The sharing of knowledge and experiences and the mixing of abilities across the two fields is necessary and useful to both parties" (EO5). Her colleague affirmed that "Cross-

pollination is always healthy…because through it you get fresh ideas which then have to be adapted to a different scenario" (EO3). Cross-pollination enables the individual "to see things from a different perspective. Inevitably, all of us tend to be creatures of habit so the fact that you have to see things from a different perspective helps you to question your own assumptions, your own way of doing things. The sharing of different views is significant and essential. It's so easy for teachers to be a bit blinkered" (EO4). Thanks to cross-pollination mainstream teachers will be able "look at their jobs from a different perspective, perhaps use ideas which they haven't used in the past… The trainers would be more aware of the kind of activities and language promotion that occurs in mainstream schools" (EO1).

According to one EO "whenever a trainer stands up in front of a group of teachers and says 'This is something I've tried and it works', whenever this happens you are going to get a receptive audience… I think that the trainers will benefit as well because by getting in touch with teachers who teach a group of students for a whole scholastic year they get a bit of a different perspective from what they're used to" (EO2). These EOs clearly believed that as much as teachers stand to gain from the process of being trained by people hailing from a different sector, the trainers themselves would benefit from cross-pollination.

The trainers shared the EOs' belief about the mutual benefits accrued via cross-pollination. One trainer confirmed the idea that "we can learn from each other. We taught them the way we do things and they taught me how difficult it is to motivate their students. They also made me think outside the box… It was a mutual learning experience" (TT2). A colleague of hers agreed by saying, "it's helpful for one sector to try to develop another because they have different perspectives and so people can learn from each other… So if the ideas of what we do in the ELT world are communicated to mainstream teachers they can benefit from them… However, I myself learnt as a trainer, even practical ideas of what I could do with my own students" (TT3).

This sentiment was also shared by a trainer who suggested that, "you always learn from somebody else's experience. Something that I have found works for me I can pass on to people who might find themselves in a situation similar to mine. However, they helped me too. I got ideas from them of how they actually do some things… So I think it's been a two way thing" (TT5).Another trainer remarked that, "It was encouraging for

them to see that where I was coming from wasn't completely unrelated to their context… I came to appreciate the fact that mainstream education isn't entirely different from the ELT model and situations… The experience was quite educational for me as well" (TT9). All the trainers seemed to be indicating that, "it's always good to get out of your comfort zone and become aware of what's happening in other schools and in other contexts" (TT4). For them, "you can only gain from something like that; you have nothing to lose" (TT7). As one trainer put it, "with pretty much anything in life a different set of eyes can point out things that you might not be aware of or different ways that you can do the same thing" (TT12). The trainers' belief that cross-pollination is a two-way process illustrates their commitment to their own professional development via teacher training.

Some of the most important lessons that the trainers learnt from the cross-pollination that took place as part of the in-service course were in relation to the mainstream teachers they helped to train and the context in which these operate. One trainer explained that "one of the things we got is a real respect for the teachers. In Malta…teachers of English are often maligned for things that have nothing to do with the way they do their job. Their professionalism, their seriousness, their insightfulness, their intelligence and also their enthusiasm, these were things that the other trainers and I were able to take away from this course" (TT1).

Another trainer valued the fact that the teachers "came up with ideas and changed my way of thinking about primary school teachers. They are almost all motivated and passionate about what they do… It was certainly interesting to see that we're all pulling in the right direction. They are not doing things which are very different from what we do" (TT10). The teachers' enthusiasm for the training also helped to impress the trainers: "I was impressed that they were very teachable and very willing to learn… I was expecting some barriers to be thrown up but there was none of that" (TT12). It seems as if the course helped to undermine certain preconceptions some trainers might have had: "What I found very interesting is that these teachers aren't opposed to English as some people might imagine" (TT8).

This re-evaluation of mainstream teachers was bound to a better understanding of the context in which they teach: "I learnt about the restrictions they had which we don't have here. They don't have the freedom that we have so I understood their situation better" (TT7). This led one trainer to admit that she has "a better appreciation of what they

have to do as teachers of English" (TT6).

A colleague of hers concurred by saying that "Mutual respect is perhaps what emerged from this course… On our part there is definitely more respect for the challenges these teachers face in their classrooms" (TT1). It seems clear that one of the most valuable benefits of cross-pollination is that it acts as an opportunity for even experienced educators to develop new insights into the educational process.

Challenges of cross-pollination

Cross-pollination brings with it a number of challenges, the most significant one, perhaps,is thatrelated to the contextual differences between the two sectors involved in the process. In fact, it was anticipated that one of the obstacles to the success of the in-service course would be the trainers' possible lack of knowledge of the context in which mainstream teachers operate in Malta. Thus, irrespective of the fact that most of the trainers had plenty of experience in training mainstream teachers from other countries, it was still deemed necessary to provide them with as much information as possible about the local primary and secondary classroom contexts and the respective needs of the teachers.

This is in line with Hyde's (2000) idea that "It is helpful for trainers working in educational innovation projects to research the local educational culture" (p. 271). In the months leading up to the course, each trainer researched the mainstream classroom context to ensure that the course would fully address those needs. The trainers' attitude was also fundamental in this regard and in fact they did not adopt the stance of all-knowing experts addressing a group of novices. They were aware that the teachers were university graduates, most often with long years of classroom experience. Their intention was to help the teachers enhance their language awareness and not to provide them with something they lacked altogether. Nonetheless, this challenge could not be overcome completely.

The EOs affirmed that in a situation of cross-pollination the trainers' lack of familiarity with the teachers' context might lead to resistance. One EO claimed that,"the biggest challenge is that the trainers have never been in exactly the same context as the teachers they are training" (EO2). This might lead to a situation in which "the teachers might not always find

what they're being presented with as relevant to the context where they teach" (EO1). Another EO pointed out that "One of the challenges could be that either one of the two parties might not be able to understand the different scenario in which the other one operates… Some approaches used in language schools cannot be used in the mainstream classroom, so, as professionals, the teachers need to weigh whatever is being offered to them and apply it or adapt it to the situation they're working in" (EO3). For this to happen effectively both trainers and teachers need to have the right attitude: "It's a question of attitudes and open-mindedness. If you're not open to this kind of thing you're going to miss out. The attitude of both trainers and teachers has to be the correct one" (EO5). Respecting each other as professionals and being willing to learn from one another are crucial attitudes for both parties. This is especially crucial given the fact that "There might be this fear of being looked down upon. Nevertheless, I think teachers are very mature and they know that this is merely a situation of professionals talking to fellow professionals and sharing with them practices which perhaps they might not be aware of and vice versa" (EO4). The EOs indicated that even though there exists the risk that teachers might resist training delivered by trainers from another sector the risk is worth taking if one trusts the professionalism of both parties.

The trainers acknowledged that their own lack of familiarity with the teachers' context might constitute a difficulty for effective cross-pollination. One trainer maintained that, "the contextual differences are a major challenge. They teach classes of around 25 learners which is rarely the case in the ELT sector. There's also the fact that they are syllabus-bound while we are less so… Failing to understand these crucial differences can lead to arrogance and therefore it fuels the perception that what the trainer is doing is irrelevant for the mainstream teachers" (TT1). Another trainer explained that, "We were aware that we were going into a different sector but perhaps I wasn't aware of how different… If a trainer fails to adapt it would be a huge mistake" (TT6). This would be because of the resistance that might arise, which was not the case on the in-service course discussed in this article. In fact, a trainer admitted, "I thought they were going to resist me but on the whole it was better than I expected" (TT2). Another trainer said, "I was afraid I was going to face a wall of people thinking 'Who do you think you are coming from the outside and presuming to teach me anything?' I'm sure there were one or two who thought that way but I was pleased to see that I was wrong about the majority… They were very receptive and open to learn" (TT5).Another trainer confirmed

thisaspectstating that, "some teachers weren't receptive to the ideas that we shared with them because of the belief that what we do in ELT is not applicable to their context. But these were a minority" (TT3). In order to prevent this kind of resistance it is "important to be clear about your objectives. You're there to help them understand something that is your area of expertise. You have to show them respect" (TT8). This is especially necessary in light of the fact that "Some teachers have a mindset about how to do things and this might stop them being open to alternatives… It's difficult to change a teacher's mindset in three days; at least you plant the seed" (TT6). The likelihood of effecting such change is linked to the attitude adopted by the trainer. One interviewee asserted that "Establishing your credibility as a trainer is essential. You want them to respect you as much as you respect them… I did think I would meet a lot of resistance but by building rapport with them at the very beginning they were very open throughout the session" (TT9). These interviewees implied that in a situation of cross-pollination trainers should seek to offset the negative effect of lack of contextual knowledge by treating the teachers with respect and by clarifying that the training is a learning experience for them as well.

The problems associated with a lack of familiarity with the context are compounded by the preconceptions that trainers might have about the teachers. In fact, one trainer warned of "the danger of the preconception amongst many ELT teachers that we're doing it right and they're doing it wrong" (TT1). Some people in the ELT sector might "think that there is a bigger distinction between being an ELT teacher and a state school teacher, that secondary school teachers aren't up to the high standardsof language school teachers" (TT3). These preconceptions are usually driven by the fact that "a lot of people in our sector have never tasted mainstream education so you get a lot of assumptions about teachers which are incorrect… Some people even attribute certain stereotypes associated with the kids these teachers teach to the teachers themselves, which I think is unfair. The teachers are very dedicated and I know because I taught in a secondary school for seven years" (TT11). Some trainers actively sought not to be determined by any stereotypes: "I did hear a lot of things about primary teachers but I didn't let them influence me. I had some experience working with mainstream school teachers and so I didn't have any negative impressions of them before going into the training session" (TT4). One trainer called for more "tolerance because in the ELT sector some people look down upon mainstream school teachers and blame them for the decline in the standards of English proficiency. But I think it's a bit more

complex than that" (TT10). She explained that the course helped her to re-assess her views of such teachers:"being prejudiced as a trainer is a problem. This course helped me to open my eyes… Many trainers are out of touch with the mainstream sector so such a course is very helpful for us as well" (TT10). Similarly, a colleague of hers confessed that initially she had thought that, "encouraging them to teach in English when English is not their first language was going to be a problem. I did think this was going to be an obstacle but in fact it wasn't… I was pleasantly surprised actually" (TT9). Another trainer admitted he and his peers "had certain preconceptions about what we were going to face in training session. I was quite apprehensive going into the first session but in the first 15 minutes I could already see that this was going to be OK" (TT12). This kind of transformation in some trainers' perception led one interviewee to claim, "I think the course was a downright success but next time round the trainers are going to go into it with a completely different viewpoint of the teachers attending the course" (TT11). The fact that the course proved to be an educational experience for the trainers as much as for the teachers underscores the idea that cross-pollination does not just lead to the sharing of knowledge and skills but helps the two parties involved in the process to develop their beliefs and attitudes about the other sector.

Necessary conditions

The EOs and trainers were asked to identify the necessary conditions for effective cross-pollination. As expected most of these conditions have to do with maximizing the benefits, and overcoming the challenges discussed above.

The EOs deemed contextual knowledge and sustainable teacher development to be paramount for effective cross-pollination. ELT trainers "need to be aware of the context if they're going to train more mainstream teachers in the future. They also need to be familiar with the different levels in primary education and the type of assessment used in mainstream education" (EO1). One EO pointed out that "The trainers' awareness of the context in which the teachers work might also affect the performance of the trainers and of the teachers because if they are not aware exactly of the conditions that teachers work in, it might affect what's being done in the training session" (EO5). This also comprises an awareness of the teachers' needs: "we would need a better understanding or evidence of who are

those teachers who have the greatest need for such training because here we saw a one-size-fits-all in a way. Needs analysis has to happen before such in-service courses" (EO2). Such needs analysis could be part of "the ELT trainers' familiarization with the schools that teachers work in. It would be useful for the trainers to go in and see what the schools are like, even if it's an informal meeting with the teachers on a voluntary basis perhaps" (EO2). Sustaining the relationship between the two sectors is essential in this regard. Hence it is necessary to engage in "a healthy discussion about the divide between the mainstream and ELT sectors. I was talking to a secondary teacher who told me that she wears different hats depending on whether she's teaching in a secondary school or a language school… Synergy would be much more useful" (EO3). The kind of cross-pollination effected through the in-service course "should not be a one-off. This is a *sine qua non* because a one-off thing is always seen as peripheral. So I think this kind of relationship between the two sectors should be cultivated further. Such training should be ongoing" (EO4). According to this interviewee, cross-pollination "should definitely be ongoing so that EOs can actually see how effective such training is. As it is you cannot really be sure that what has been disseminated has been assimilated. The whole idea of these one-off INSET sessions should give way to something more ongoing" (EO4).

Another way of sustaining cross-pollination is by having "ELT trainers working with one or two colleges on a regular basis to develop experience in relation to mainstream education and to provide teachers with even better training" (EO2). Ensuring that the kind of cross-pollination seen in the in-service course happens on an ongoing basis would be beneficial for both teachers and trainers.

The ELT trainers concurred that contextual knowledge is necessary for effective cross-pollination. Despite the fact that they were provided with information about the context and the teachers before the start of the course, the trainers still felt that in the future they would benefit from familiarizing themselves even further with the trainees and their context. One interviewee mentioned that trainers "need a little bit more information about the trainees prior to running the course… The trainers need to familiarise themselves as fully as possible with the context so that we can adapt completely to the teachers' needs" (TT4). A colleague of hers admitted that he "would like to be a bit more familiar with what goes on exactly in the classroom. Some of my assumptions as to what they teach

were not correct. I'd like to know a bit more about what they do in class because then that is the starting point for how we can help them do things better" (TT12). This knowledge of the trainees and their context is bound to the significance of a needs analysis exercise. One trainer explained that, "it would be good if a needs analysis is conducted prior to the course so that the teachers themselves identify their training needs" (TT2). This means that, "The teachers should be consulted about their needs" (TT4). Such an exercise "would help [trainers] a lot because it would help us to direct our training to those specific needs" (TT6). A needs analysis exercise would enable teachers to inform trainers of "what they would really like to focus on so that you'd work towards their needs... To know what they need exactly you have to ask the teachers" (TT10). This is necessary in order for teachers "to be convinced that the course is going to be useful and that it isn't just another in-service course that they have to attend" (TT12). Hence, "Clear objectives about what is to be attained by the end of the course are necessary" (TT11). One way by means of which the needs analysis exercise can be conducted is throughproviding trainers with the opportunity of meeting teachers in their own context: "meeting some teachers would have been better than a description, especially since some trainers weren't fully sure of what to expect" (TT3).

Another interviewee explained that, "Many of the trainers would actually benefit from observing mainstream school classes before the course begins" (TT1). A colleague of his said that, "As a trainer, being able to sit in the teachers' classes would give me an insight into what they really need" (TT2). This was echoed by an interviewee who claimed that "The trainers need to have the opportunity to observe teachers before the course in order to verify what their needs are" (TT8). The act of consulting teachers was considered so important by the trainers that they highlighted the need for a bottom-up approach to teacher development: "giving the teachers a choice as to which sessions they want to attend might be better because they would attend the sessions that best address their needs" (TT3). The trainers highlighted their belief that in order for them to be most effective in the training of teachers from the mainstream sector they need tobe given access to the teachers, their context, and their actual needs.

Forging a strong relationship between trainers and teachers would help both parties develop the right attitude towards the other sector and guarantee a sustainable form of teacher development. According to one trainer "there needs to be mutual respect otherwise this can't work. If we

as trainers see them as teachers who are not making language learning motivating or interesting and they fail to see us as professionals because perhaps we lack a degree in education, it won't work" (TT4).

Another interviewee remarked that, "the teachers need to be assured of the expertise of the trainers and that what they're going to be learning isn't just theory but is going to be useful in the classroom" (TT12). In order to consolidate respect between the two parties and maximise the benefits of cross-pollination, training needs to be ongoing: "I think frequency would be a very important factor even though that's difficult… Both sectors would get to know the other better and the more we learn about the mainstream sector the more we'd be able to adapt our training to suit their needs" (TT6). Sustainable teacher development ensures long-lasting impact: "If teachers do not implement what they are absorbing in these training sessions then we are going nowhere. So there needs to be some form of follow-up to encourage them to move in the right direction" (TT9). These trainers expressed the belief that in order for cross-pollination to be effective the two sectors need to keep the communication channel constantly open. This would allow both trainers and teachers to benefit.

Conclusion

The feedback collected at the end of the in-service course was testament to its success. The majority of participants pointed out that the course was useful for their needs as teachers of English and would facilitate their task of teaching the language even more effectively. As Bartolo and Xerri (2014) point out, language awareness needs "to become a priority of teacher training programmes at both pre- and in-service levels. This is crucial given that teachers' authority in the language needs to be sustained on an ongoing basis for the benefit of all their students" (p.39). Nonetheless, perhaps the biggest success of this course was that it pioneered some of the principles of a generative and transformative model of professional development in the local mainstream context by illustrating how cross-pollination between two educational sectors can be mutually beneficial. In order for such a model to become fully entrenched it is necessary to move away from the traditional format of a one-off, intensive INSET course and adopt a more sustainable approach that cultivates teachers' identity as lifelong learners.

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SHORT COMMUNICATIONS

The Development of a Teaching and Learning Resource Pack as part of a B.Ed (Hons) dissertation in Mathematics

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Introduction

"The world that schools are being designed for is changing, propelled by some powerful drivers" (Heppell et al., 2004: 2). It is undeniable that the 21st century has brought about countless drastic changes and developments. Catalysts for change are numerous and include environmental, social, economic, political and technological influences. One may ask how this affects the teaching pedagogies.

Stephen Heppell et al. (2004) highlight that the 21st century marks a shift from an information age to a learning age. This transition calls for learners who are equipped with skills including communication, collaboration, critical thinking and creativity (Trilling & Fadel, 2009). Teaching pedagogy based on Inquiry Based Learning aims to fulfil the needs of this shift, assisting contemporary learners to acquire the aforementioned skills. The acquisition of these abilities can lead to necessary career and life skills such as initiative, self-direction, social and cross-cultural interaction, leadership and responsibility. As Toffler aptly puts it: "the illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn" (1970, p. 367).

Inquiry Based Learning (IBL)

IBL is a very suitable pedagogy within this climate for learning. IBL is a student-centred pedagogy in which learners inquire, engage, investigate, explore, explain, evaluate, debate and collaborate to develop an inquiring mind with a positive attitude towards the subject (PRIMAS, 2013). IBL pedagogy is associated with the connectionist approach, which has its roots in constructivism (Swan, 2005). Through the process of IBL, the students' prior knowledge and experience are the main starting points, and learning occurs mainly by means of logical reasoning and making adequate connections to previous knowledge, resulting in the growth of mathematical understanding (Maaß, 2013). Benefits of IBL that have been outlined by the European Commission (2007) include:

- an increase in the students' level of attainment in the subject,
- deeper understanding of the important concepts underlying mathematics,
- better transferability of knowledge to new situations,

- the advanced ability to carry out tasks which require higher-order thinking,
- the development of cross-disciplinary abilities such as the ability of working effectively in a group,
- the development of a more realistic perception of the applicability of the subject to real life situations,
- an increase in motivation and hence participation in learning the subject,
- an increase in the interest of choosing a science-related career, irrespective of one's gender.

IBL is a process that aims to develop inquiring minds and attitudes, which are most likely to be extremely valuable to the work of future mathematicians and scientists (Garcia, 2013). When IBL is implemented inside the classroom the students are not passive receivers of information anymore, but rather they construct knowledge themselves by forming appropriate connections between mathematical concepts. In fact, this view of mathematics complies with that of Thurston (1990) as he describes mathematics as follows:

> *"Mathematics isn't a palm tree, with a single long straight trunk covered with scratchy formulas. It's a banyan tree, with many interconnected trunks and branches – a banyan tree that has grown to the size of a forest, inviting us to climb and explore" (p.7).*

The teacher's role in IBL is that of challenging students with carefully selected problems and tasks, supporting inquisitive logic and valuing all the students' contributions. As a result, students develop a deep understanding of mathematical concepts as well as real world applications of the subject, and hence IBL becomes motivational and enjoyable for learners (Swan, 2005).

IBL can therefore be an effective solution addressing the issues of early school leavers and the great proportion of low achievers which is evident in the 12 per cent of students in Maltese schools scoring less than 400, the low benchmark, in the TIMMS assessment of mathematics (Ministry for Education and Employment, 2013).

The Resource Pack

Throughout our four-year B.Ed (Hons.) course in mathematics we had the opportunity to connect with the lives of a number of teachers, and in the process became aware of the large amount of time that these teachers spend on the preparation and planning of lessons. Moreover, creating tasks that promote IBL can be time-consuming, so we chose to work towards lessening the burden on teachers by providing them with a selection of tasks that can be easily adapted and implemented in the classroom.

In our opinion a resource pack, complete with worksheets, lesson plans and additional resources including PowerPoint presentations, WebQuests, videos and flashcards, can help to motivate and enthuse teachers to use IBL in the classroom. With the help of our supportive tutor, Ms Marouska Zahra Micallef, we produced a teaching and learning resource pack for the Shape, Space and Measures section of the Form 1 syllabus (level 7 to 8) based on IBL, which we believe satisfies this desire for change.

Shape, Space and Measures is one of the four major content strands of the mathematics syllabus for Maltese secondary schools (Department of Curriculum Management, 2014). Teaching this field of mathematics should be an enjoyable experience to both educators and learners since "children have a natural desire to touch, feel, look at and handle spatial elements" (Frobisher, Frobisher, Orton, & Orton, 2007, p.6) and, in providing opportunities for students to explore this geometrical sphere of mathematics, teachers are fulfilling these desires.

While compiling our resource pack, we followed the teaching approach for the learning of geometry as proposed by van Hiele and which involves five phases. These are: Inquiry/Information; Directed Orientation; Exploration/ Explication; Free Orientation; and, Integration (Clements, Battista, & Sarama, 2001). Pierre van Hiele insisted that the levels progress sequentially (Frobisher et al., 2007), and thus the teacher should guide each and every student to proceed to the next respective level by adequate tasks, challenges and rich experiences (Clements et al, 2001). This supports the idea that the van Hiele teaching approach concurs with the pedagogies supported by IBL.

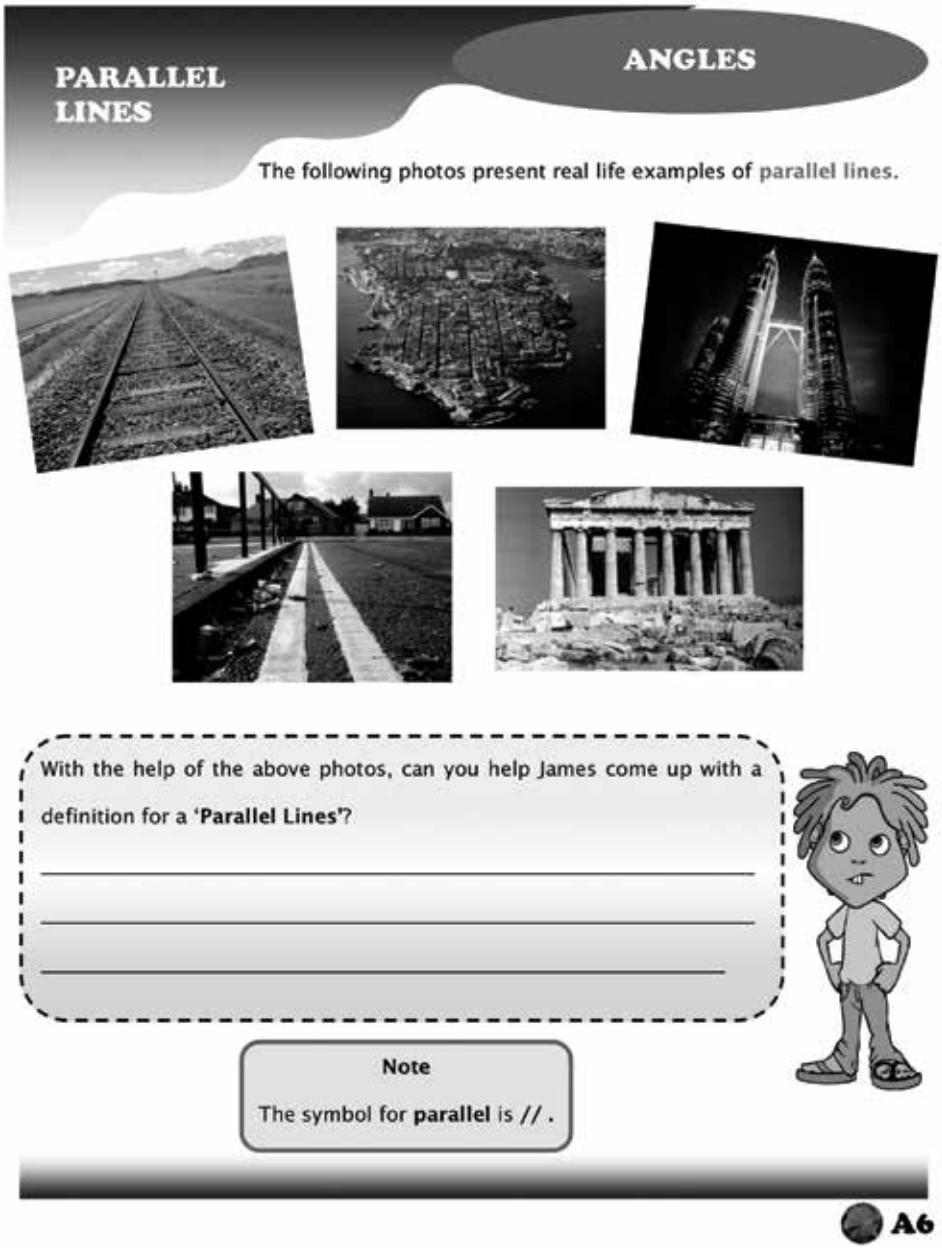

Fig. 1: Examples of worksheets from the students' resource pack

Testing the Resource Pack

For the testing of the resource pack, we made use of four main data-collection tools, namely, teacher interviews, field-notes taken through observation during the pilot study, student questionnaires and pertinent documents. These enabled us to collect qualitative in-depth data about the design and content of the resource packs.

In turn, this information helped us evaluate the effectiveness of various aspects of the resource pack. We analysed the teachers' and students' feedback, reflected on each recommendation made, and identified and made the necessary amendments in the resource packs. Through this process of analysis, we also acknowledged the challenges that the teachers might face when implementing the resource pack in their lessons. Having said this, we strongly believe that if teachers make step-by-step transitions to employ constructivist-based methodologies by implementing inquiry-based tasks in the lessons, this will highly benefit students' learning.

Overall, our observations of student behaviour during the pilot study, field-notes taken during the same session, and students' feedback through the questionnaires, demonstrate that the students would prefer if the teacher uses these worksheets during mathematics lessons. This positive response is also evident in the teacher's comments given during the interviews. As put succinctly by one of the respondents: *"Kellu bżonn ikollna xi ħaġa hekk. Veru interessanti u jgħinna."* [It is desirable to have something like this. It is highly interesting and helpful.]

Main aspects of the resource pack

The design and layout of the students' resource pack – the use of colour, position of text and images, size and type of font, font style and line spacing – have been implemented carefully and with purpose, in the students' resource pack. We do believe that the visual appearance of a textbook page can make a "considerable difference to the enthusiasm" with which the learners approach a task (Shuared & Rothery, 1984, p.89). We made use of a number of illustrations in the students' resource pack, where the visual element was given exceptional importance since this can "simplify information that is difficult to understand" (Heinich et al., 2002, p. 112).

METRIC MEASURES ~ CAPACITY

METRIC MEASURES AND TIME

COOKING WITH CHEF JAMES!

James is making pancakes. He searches in a cookbook and finds this recipe:

Pancake Recipe

(makes approximately 6 pancakes)

120 g flour
300 ml milk
1 egg
a pinch of salt

(i) How many pancakes will 450ml of milk make?

How much should be added to the amount of milk shown on the measuring jug in reach 450ml?

(ii) How many 1 litre milk cartons are required to make 24 pancakes? How would you use this jug to measure the required amount of milk?

Fig. 2: Examples of worksheets from the students' resource pack

The tasks designed in the students' pack seek to create contexts that the students are familiar with, thus making the content more applicable to real life situations. We strived to use simple vocabulary and mathematical terms that are suitable to the target age group, namely eleven to twelve-year-old students.

The design of the teachers' resource pack aimed at helping the teacher who is making use of the worksheets that are available in the students' resource pack. Its main objective is to provide clear instructions on how the tasks in these worksheets may be developed in a classroom setting. Notes, hints and extensions are available (see Figs 1 and 2).

Accessing the resource pack

The ultimate purpose of our dissertation is the dissemination of our resource pack to the teaching community. In this way we have sought to make our work accessible to all those interested. State schoolteachers can download the pack from the Fronter. Alternatively, a soft copy of the resource pack, including both the students' pack and the teachers' pack can be obtained from the Mathematics Education Officers, Room 17, Curriculum Centre, Floriana, or by contacting the authors.

Recommendations for future research

We put forward the suggestion of extending the teaching and learning resource pack based on IBL to other mathematics strands (Number, Algebra and Data Handling) and year groups. In addition, it would be interesting to conduct a quantitative comparative study to investigate the effects on students' learning of using this resource pack as opposed to resorting to traditional teaching pedagogies.

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