| **Title** | A case study of social constructivist model of teaching in a technology-enabled environment for primary 4 pupils at Nan Chiau Primary |
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A Case Study of Social Constructivist Model of Teaching in a Technology-Enabled Environment for Primary 4 Pupils at Nan Chiau Primary

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ABSTRACT

In line with TLLM and I & E, Nan Chiau Primary seeks to move away from the traditional mode of frontal teaching to adopt the social constructivist model of teaching with pedagogical intentions which focus on nurturing pupils skilled in creating, evaluating and sharing knowledge in authentic learning experiences. The school’s Microsoft Class Server, the infrastructure of wireless technology and handheld devices, provides the structure for the integration of social constructivism across four core subjects in the curriculum. The action research conducted in 2005 sought to understand how the social constructivist model of teaching in a technology-enabled environment is integrated in Primary 4 curriculum using three dimensions of inquiry: perceptions of pupils towards learning; practices of learning; and performance of learning. The findings of the action research project hopes to provide a model for teachers and school leaders who wish to better engage pupils in learning through social constructivist processes in an ICT environment.

INTRODUCTION

Based on our teaching experiences, it is not uncommon for teachers to tend towards frontal modes of teaching in order to have control over curriculum content matter and delivery. However, with the emphasis on ‘Teach Less, Learn More’ (TLLM) and Innovation and Enterprise (I& E), there is the need to equip teachers with teaching pedagogies that will allow them to engage pupils in knowledge management; provide pupils with opportunities to scaffold their own learning; and facilitate pupils to learn collaboratively with others to source for and engage the knowledge they encounter. This is the core of the school’s wider thrust of using ICT (information and communication technology) to enrich pupils’ learning, which began in 2004.

Upon reviewing their previous ICT initiatives by end 2004, the school’s Planning Committee members in consultation with two researchers from the National Institute of Education (NIE), who were also consultants for this year-long project, decided to adopt the social constructivist
model of teaching and learning in Primary 4 curriculum using ICT technology resulting in a project entitled ‘eNCee’ (Enterprising in the use of handheld learning device, Microsoft Learning Gateway and wireless technology at Nan Chiau) which makes use of the Microsoft Class Server, HP iPad handheld device and wireless technology. In addition, action research principles and practices were used to guide the developmental aspects of the project.

On the whole, the eNCee project attempted to integrate ICT, social constructivism and subject content and skills for English Language, Mathematics, Science and Mother Tongue together (Diagram 1). However, at least two planned lessons integrated ICT and social constructivism for each subject per semester, which in total added up to sixteen lessons for the whole year. Lesson planning was distributed among teachers and coordinated by the respective departmental heads responsible for their subject areas. This was to help teachers with the necessary changes made to the curriculum and at the same time fulfil curriculum change at a wide scale.

**Diagram 1: Integrative Elements of eNCee Project**

**THEORETICAL BACKGROUND**

The emphasis on social constructivist learning located in ICT environment is in our view timely. There is an increase in the number of research in recent years about the impact of technology on teaching and learning. Prevalent theoretical perspectives relate to social constructivism where learning is seen as a process of actively constructing knowledge by integrating experiences into the learners’ existing schemata, and where learning environments support this learning process by providing multiple perspectives or interpretations of reality.
Good instructional practices are therefore considered along with the potential of technology in order to produce quality programmes.

However, no technology in and of itself can be made to affect thinking. One needs to consider both theoretically and practically, the whole social and cultural milieu in which instruction takes place (Salomon, 1991, cited in Steketee, 2004). Thus, learning experiences should enable knowledge construction in the learner through providing context-rich, experienced-based activities. Furthermore, teachers will ask “What is going on in students’ mind when……….?” rather than focusing on behavioural outcomes per se. Part of the role of a teacher is to avoid providing the students with knowledge and solutions when it is possible for them to work them out for themselves (Moore & Rocklin, 1998). The classroom therefore becomes a complex ‘cognitive system’ where both teachers and pupils interact with one another using a variety of resources in the pursuit of cognitive activity (Steketee, 2004). The emphasis is on teachers’ use of multiple epistemologies to maintain dialectic tension between teacher guidance and student-initiated exploration, as well as between social and individual learning.

METHOD

The eNCee project integrated an action research conceptual framework which acted as a guide for systematic inquiry and change in pedagogical practices. The action research framework makes use of two action research cycles comprising plan-act-reflect-plan-act-reflect-plan-act-observe which spanned over the year. Lessons were planned, taught and reflected upon before they were passed to other teachers within the same level. This plan-act-reflect cycle could be two or one cycle before the final revised lessons were planned and taught (Diagram 2), along with an observation which consisted of a questionnaire survey, classroom observation, focused group interviews and artifact analysis (Diagram 3).

![Diagram 2: An Action Research Cycle for 1 Semester](image-url)
The research question that the school had in mind was –

*How has the integration of ‘Microsoft Class Server – Wireless – Pocket PC’ technology with social constructivism in Primary 4 curriculum subjects influence the perceptions towards learning, practices of learning and performance of learning?*

**Diagram 3: Dimensions of Inquiry**

Operationally, all Primary 4 teachers took on the role of action researchers for the eNCee project including the department heads and subject heads who played a bigger role in the observation aspect in the action research cycles. Classroom teachers were primarily involved in lesson planning, teaching and reflection (Diagram 4). Nevertheless, the general idealised model of action research (Mills, 2003) was followed.

On the whole, we were guided by Nuthall’s (2002) conception of social constructivism where knowledge creation and evaluation stand at the centre of learning. Learning is not merely the transference of knowledge without question it or grasping the meaning attached to knowledge.
FINDINGS

1. Artifact Analysis
The purpose of the artifact analysis is to identify themes, categories and generalisations relating to the performance of learning that takes place in the classroom. In total, 12 artifacts in the form of digitised pupils’ work were analysed. They were selected based on the perceived effectiveness of the teacher.

1.1 Creating Knowledge
Social constructivist model of teaching advocates pupil centric learning, with less emphasis on the teacher providing content. The related activities planned encouraged critical thinking in pupils. This is evidenced in the way questions were fielded via the discussion forum with our mountaineer, Mr Khoo Swee Chiow and footballer, Mr Fandi Ahmad. Pupils built on knowledge they already knew to create new knowledge based on their research with team mates. For example, pupils discussed what they already knew about mountaineering and listed areas where they needed more information. Pupils were able to source for information via different modes. Learning was more authentic when teachers arranged for pupils to meet and listen to Mr Khoo share his experience. They also had an online discussion with him to know more about mountaineering.

1.2 Sharing Knowledge
Pupils were actively sharing information with one another as they had direct access to the questions and responses posted by their friends via the discussion forum in the shared portal. They were very keen to express their opinions and were very enthusiastic about sharing information they had read or found via the handheld devices. A pupil even tried to substantiate her friend’s views with her personal experiences. However, the degree of enthusiasm varied with subjects. This could be due to the availability of opportunities for self-expression. When opportunities were few, the degree of enthusiasm dropped accordingly and vice versa.

1.3 Evaluating Knowledge
Pupils were actively reading and responding to their friends’ comments. The process of working through information gained and generating new questions provided a deeper
understanding of the topic. They were engaged in peer evaluation as they posted their answers online. They got to check their solutions against those posted by their classmates. For example, in one Math lesson, pupils were able to comment on their friends’ model and come up with alternative ways to solve problems. Pupils were able to apply what they had learnt from websites to real life scenarios. For instance, pupils were able to explain how the good qualities they had read would bring about a more gracious society.

2. **Classroom Observation**

The purpose of classroom observations is to identify themes, categories and generalisations relating to the practices of learning that take place in the classroom. In total, 12 classroom observations were carried out. They were selected based on the perceived effectiveness of the teacher.

2.1 **Use of ICT**

Teachers were competent in the use of ICT (use of handheld devices, class server, e-portal) to create a richer environment for peer teaching and sharing. Pupils were encouraged to represent and communicate their learning in a variety of ways. For instance, pupils conducted voice-recordings of their interviews and transcribed their findings onto the class server.

2.2 **Authentic Learning**

Though most teachers required their pupils to think about or discuss either a simple real life problem or scenario related to the lessons, some appeared to be isolated activities, used as a form of introduction with no follow-through. Examples of authentic learning taking place include a lesson on electricity where pupils were required to find out about the usage of electricity in their home and school and another lesson on the circulatory system where pupils who had contacts with people who had suffered heart attacks interviewed them and shared their findings with their peers. The children were highly motivated to learn during these lessons.

3. **Focused Group Interviews**

The purpose of focused group interviews is to identify themes, categories and generalisations relating to the perceptions of pupils in relation to social constructivist lessons. In total, 10 per cent of the pupil population were involved in the focused group interviews.
3.1 Perceptions Towards Learning
Pupils found learning in an ICT rich environment very interesting and were motivated to acquire more new knowledge via ICT - “This was the first time we used Pocket PC during lesson. We now know how to search for information and share information with our classmates and teacher using the Pocket PC. We can do this anytime, anywhere in the school. There is no need to go to the computer lab...”. Pupils enjoyed interacting with their peers via on-line discussion forums and they commented that they had learnt better in small groups. More questions were asked and answered than in an ordinary classroom setting.

3.2 Perceptions Towards Social Constructivism
Pupils liked lessons based on the social constructivist model of teaching. They found learning more meaningful and interesting. They now have many ‘teachers’ instead of one teacher in the classroom. There were more questions from pupils and more learning took place when their peers tried answering the questions and generated greater grounds for discussion.

4. Questionnaire
The purpose of questionnaire survey is to identify pupils’ attitudes towards learning in social constructivist lessons. In total, 25 per cent of the pupil population completed the questionnaire which contained 22 items. These items were ranked against a 4-point Likert Scale (1-strongly agree, 2-agree, 3-disagree, 4-strongly disagree), and an average aggregate mean of <2 for the items would imply a positive attitude towards learning.

4.1 Attitude Towards Learning

4.1.1 Pupils felt they could learn through discussing and sharing knowledge with their friends

<table>
<thead>
<tr>
<th>Q/No</th>
<th>Items</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>I discovered new things as I discussed with my classmates.</td>
<td>1.68</td>
<td>0.62</td>
</tr>
<tr>
<td>6</td>
<td>I shared what I know with my classmates during discussions.</td>
<td>1.63</td>
<td>0.64</td>
</tr>
<tr>
<td>20</td>
<td>I discovered new things through the use of online discussion.</td>
<td>1.55</td>
<td>0.79</td>
</tr>
</tbody>
</table>
4.1.2 Pupils felt that what they have learnt were relevant and could be applied to their daily lives.

<table>
<thead>
<tr>
<th>Q/No</th>
<th>Items</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>I applied what I learned in my daily life.</td>
<td>1.80</td>
<td>0.82</td>
</tr>
</tbody>
</table>

4.2 **Attitude Towards Social Constructivism**

4.2.1 Pupils enjoyed learning and sharing with each other

<table>
<thead>
<tr>
<th>Q/No</th>
<th>Items</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I enjoyed learning together with my classmates.</td>
<td>1.33</td>
<td>0.48</td>
</tr>
<tr>
<td>7</td>
<td>I enjoyed sharing my knowledge with my classmates.</td>
<td>1.60</td>
<td>0.69</td>
</tr>
<tr>
<td>8</td>
<td>I would like to have another lesson like this again.</td>
<td>1.17</td>
<td>0.42</td>
</tr>
</tbody>
</table>

4.2.2 Pupils realized they have benefited from learning objectives that were built on their prior understanding of the subject matter

<table>
<thead>
<tr>
<th>Q/No</th>
<th>Items</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>My teacher used what I already knew to help me better understand.</td>
<td>1.67</td>
<td>0.82</td>
</tr>
</tbody>
</table>

4.3 **Attitude Towards ICT**

4.3.1 Pupils liked to have ICT incorporated into their learning

<table>
<thead>
<tr>
<th>Q/No</th>
<th>Items</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>I like to use the handheld to do work.</td>
<td>1.35</td>
<td>0.61</td>
</tr>
<tr>
<td>18</td>
<td>I like to take part in the discussion forum.</td>
<td>1.65</td>
<td>0.78</td>
</tr>
</tbody>
</table>

**CONCLUSION**

The adoption of social constructivist model of pedagogy challenges traditional frontal mode of teaching. Teachers in this case study were challenged to change their role in the classroom. No longer is the teacher taking centre stage in delivering content but playing a greater role in facilitating learning as pupils took more responsibility for their own learning. The teacher is now seen to be more concerned with developing a sequence of interdependent activities, each with an essential role in the learning process, with less emphasis on ‘content feeding’. She needs to ensure that the children in learning groups share a common base of knowledge and
experience. The pace of the lesson is more pupil controlled, rather than teacher controlled. However, from the study, it is observed that in a primary school setting, the teacher may still need to closely guide some pupils in terms of content and skills to be acquired. For example, during a discussion forum, teachers need to guide pupils on the phrasing of questions and responses and remind them about the sensitivities concerned suggesting that pupils too need to change their role as a learner. In terms of mindset, teachers have to be more ‘knowledgeable’ and ‘open-minded’ as pupils come up with alternative solutions to problem-solving and question assumptions.

In a social constructivist environment, pupils are more ‘accountable’ for their own learning. While they used to rely on just one person, the teacher, they learn to interact and learn from their peers and other people in the learning community. The shift in responsibility ‘forces’ pupils to ensure that learning objectives are achieved. Learning becomes more meaningful and the children are able to relate to what they have learnt in real life contexts.

With regard to ICT technology, ICT interface is a good platform for the integration of social constructivism across the various subjects. It allows for learners to interact without having to come face-to-face with one another across a wider physical space. It serves as an excellent resource centre which is essential when pupils are encouraged to do self-directed learning. It connects pupils to the virtual world to make learning more ‘real’ and meaningful.

While teachers are enthusiastic and affirm the positive impact of the social constructivist model of teaching on pupils, they are still concerned about the time factor. With syllabi and formal termly assessments to complete, teachers tend to ‘hurry’ the pupils in their learning tasks and ‘build boundaries’ in terms of knowledge acquisition. Richardson (2003) was therefore sharp in her analysis that cultural, political and economic constraints and ideologies shape the practice of social constructivism. This in itself is a tension which the school hopes to resolve in future change projects. The next cycle of action research would involve more teachers and pupils, allowing more substantive findings. The study could explore alternative modes of assessment and ICT technologies in line with social constructivism.
REFERENCES


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