

## GENERATING BEYOND THE CLASSROOM

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### ABSTRACT

The “Teaching for Understanding” (TfU) (Perkins, 1992) framework provides a guide to teachers who want to design curriculum that focuses on developing understanding. This framework comprises four elements: generative topics, understanding goals, performances of understanding and ongoing assessment. River Valley High School has adopted the TfU framework to design the curriculum for our Integrated Programme (IP). We believe that learning will become more powerful and deeper if students can see continuity from classroom to out-of-class experiences. It is this continuity and alignment that helps students connect and apply their learning across disciplines, in and out of the classroom. In this paper, the authors will share the proposed model for conducting learning trips using the TfU framework, share insights and experiences from the trips and present work done by the students.

### INTRODUCTION

In September 2005, River Valley High School’s proposal to offer the Integrated Programme was approved, for implementation in 2006. Since then, the school has been using the Teaching for Understanding (TfU) framework (Perkins, 1992) to design a process-centred curriculum that focuses on developing understanding.

Learning will become more powerful and deeper if students can see continuity from classroom to out-of-class experiences, from academic to non-academic domains. It is through this continuity and

alignment that we help students connect and apply their learning across disciplines, in and out of the classroom. This conscious effort to help students transfer their knowledge and thinking skills to non-academic contexts is a good way to facilitate transfer of learning (Perkins, 1992). Hence, we continue this curricular effort by extending the use of the TfU framework to other aspects of students' learning beyond the classroom.

Fieldwork, which may take the form of field teaching, field trips, field research or field camps, is an excellent way to engage students in learning beyond the classroom. For example, Dando and Wiedel (1971) viewed it as a means of stimulating students' interest in Geography through a carefully choreographed sequence of activities and routes to exemplify phenomena, processes, and regions of a much larger area. Hence, field trips are good opportunities for students to demonstrate their understanding of concepts that they have studied in an authentic context. In the language of TfU, they are good performances of understanding.

In extending learning to the out-of-classroom context, several questions arise: How can the TfU framework be used to design a field trip? What does a TfU field trip look like? What is the impact of a field trip on students' learning and understanding of the subject? What are the challenges faced in organising a field trip using the TfU framework?

In this paper, we will propose a model to design field trips or learning trips using the TfU framework, share some experiences and insights from our first trip to New Zealand, and how this model has been improved. Following the successful New Zealand field trip, we have since adopted the TfU framework in designing learning for the RVHS Global Perspective Programme.

WHAT IS TEACHING FOR UNDERSTANDING (TfU)?

What is understanding? How do we teach for understanding? These questions have been the focus of a number of projects that started in 1990 involving the Harvard Graduate School of Education (HGSE). Two major projects were Teaching for Understanding and Learning at Work.

The TfU Project involved a wide range of teachers and a number of researchers from the HGSE. The researchers observed teachers who are skillful in developing understandings among their students, and through several reflective discussions relating to educational theory and practice, answers to the following set of basic questions emerged:

- 1 What topics are worth teaching for understanding?
- 2 What exactly do we want students to come to understand?
- 3 How can understanding be developed and demonstrated?
- 4 How can we assess and improve understanding?

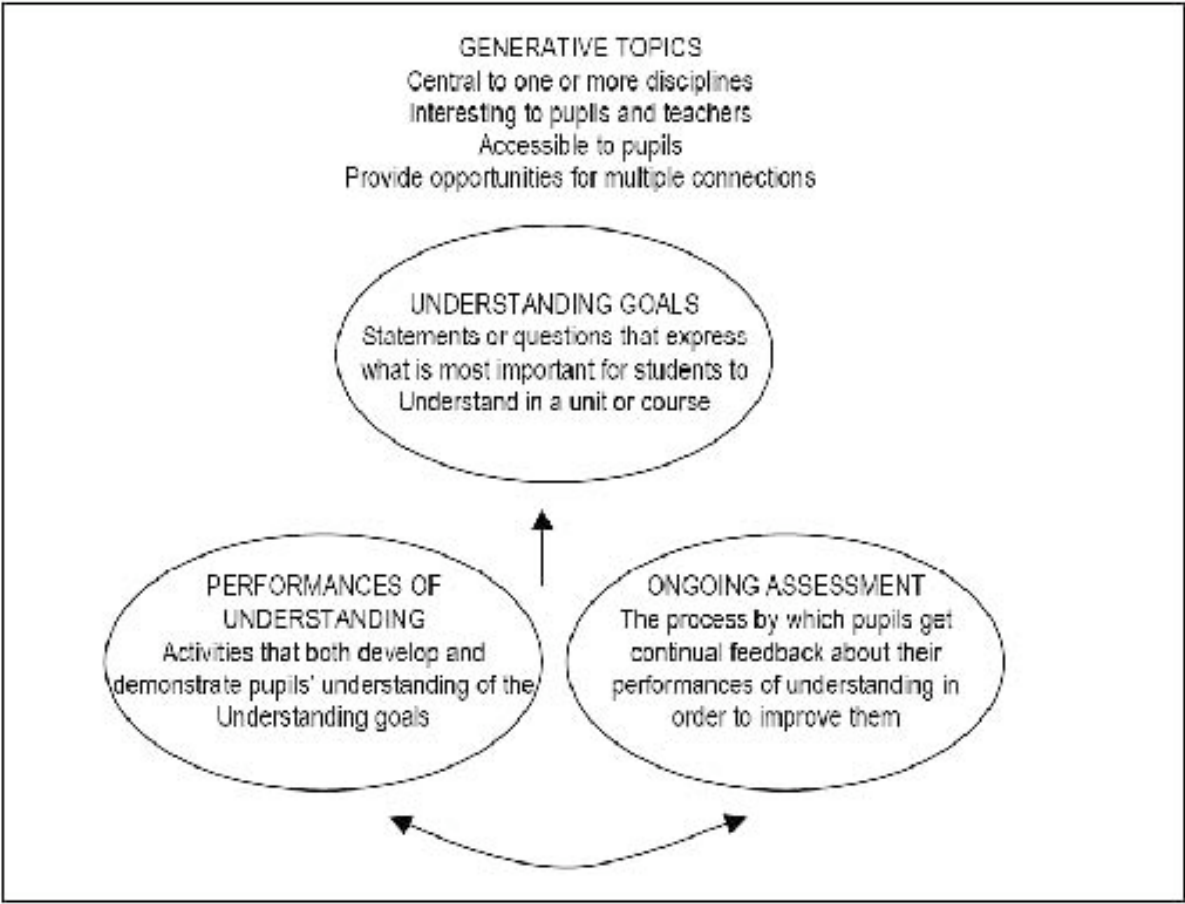
This Teaching for Understanding (TfU) project developed a way to respond to these questions in a four-element framework (See Figure 1). The four elements are: generative topics, understanding goals, performances of understanding and ongoing assessment.

According to Wiske (1998), each of the four elements addresses one of the key questions: define what is worth understanding by identifying generative topics which can be used to frame the units of learning; make clear what students need to understand by delineating clear goals centred on understanding; build students' understanding by involving them in activities or performances of understanding that require them to demonstrate their understanding; and finally, monitor their learning through ongoing assessments of their performance.

In a move towards a curriculum centred on understanding, RVHS adopted the TfU framework for her curriculum redesign. TfU differs from other frameworks in that it goes beyond the implementation of a tool but is itself a process of inquiry (Wiske, Hammerness & Wilson, 1998).

In 2006, the school adopted the TfU framework to design our academic programme. TfU has since influenced our teachers' pedagogy, and they began to question ideas and practices that were inconsistent with TfU. In so doing, the school has moved towards delivering a process-centred curriculum with a focus on developing lessons that actively engage our students.

Figure 1: Teaching for Understanding Framework



To further help students see the continuity from classroom to out-of-classroom experiences, from academic to non-academic arenas, the framework has also been used to design lessons for CHAMPS, our pupil development programme (Choy, Teo & Yap, 2007), adventure camps and other school activities.

As fieldwork requires students to develop and demonstrate a good understanding of the methods of

inquiry, it becomes an excellent opportunity to engage students in learning beyond the classroom. The natural question then is: how we can use the TfU framework to design a field trip so that our students can understand the methods of inquiry? Thus, our team set out to experiment with the framework in designing a field trip to New Zealand in 2006.

#### AN EXPERIMENT: TfU IN LEARNING TRIPS

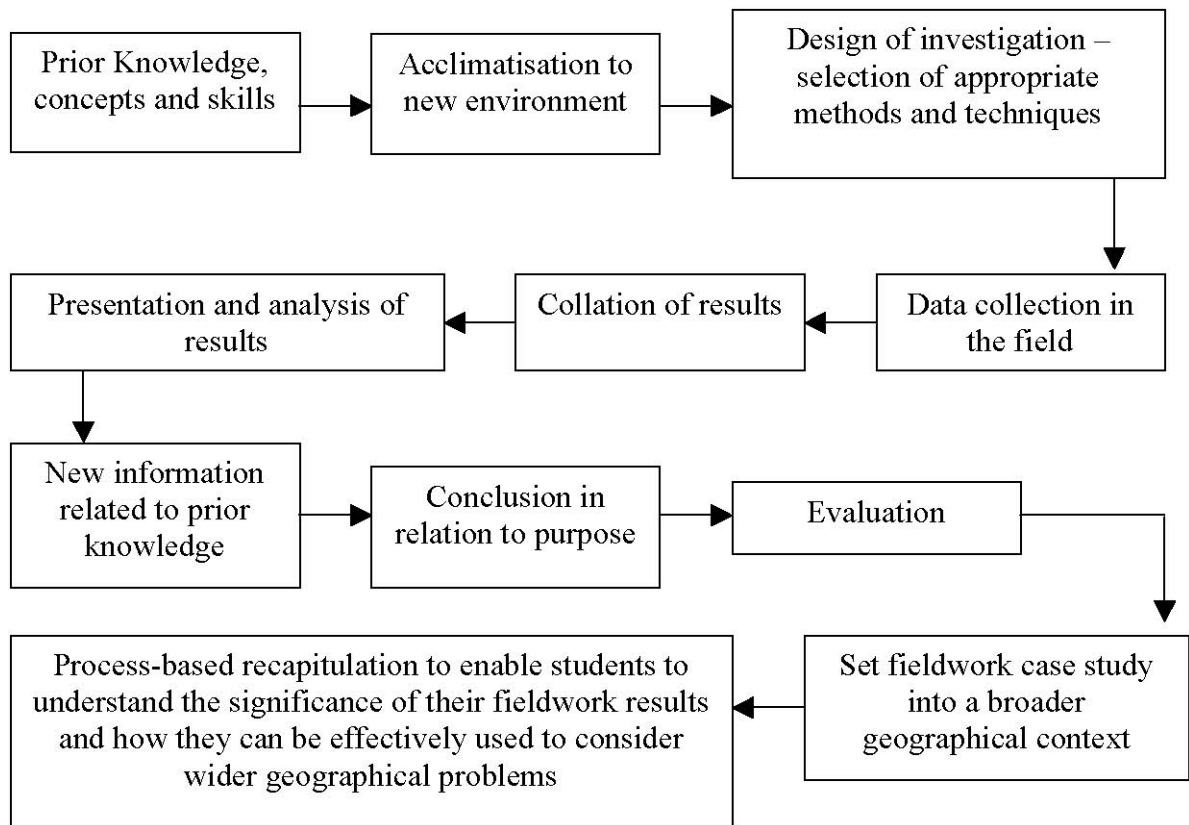
Rynne (2000) proposed that students should design the fieldwork enquiry rather than be mere participants in a teacher-led activity. This will definitely give students opportunities to gain an understanding of the methodology involved. In another project by Spedding (1999), students are involved in designing a simulated archaeological dig, so that they can understand archaeology better when they become or act as if they are one. These experiences gave us the idea of designing a learning trip where students have opportunities to design some form of inquiry during the trip.

In our first experimental trip designed using TfU, we thought it might be a better idea to have students go through some teacher-led or guided inquiry before students demonstrate their understanding of the methods in a culminating performance of understanding. With the framework proposed by Rynne (2000) [See Figure 2], we set out to design our learning trip using the TfU framework.

Our idea was to create a generative topic that would be of interest and relevance to our students to frame their learning during the trip to New Zealand. We crafted a few understanding goals, designed a series of guided performances of understanding to help students gain an understanding of the methodology of fieldwork and a culminating performance of understanding for them to actually design a mini-fieldwork inquiry. Feedback on the performances of understanding was provided mainly by teachers and the guide during the trip as a form of ongoing assessment.

To make our topic more generative so as to create more opportunities for connections, we decided on the generative topic “What makes New Zealand?”. The TfU unit plan for the trip is given in Annex 1. The framework below outlines how TfU can be used to plan a learning trip.

*Figure 2: Framework for designing field work (Rynne, 2000)*



Suggested Framework for TfU in Learning Trips

*Generative Topic:*

This is to highlight a BIG idea or concept or topic that is essential or important enough for students to investigate. This should form the focus of the learning trip and offer multiple connections to different subjects if required.

*Understanding Goals:*

This details what a student should understand by going through the learning trip experience. These

are not instructional objectives. Rather, they state what ideas or concepts students should understand at the end of the trip.

#### *Performances of Understanding:*

These are activities that help to develop students' understanding in the understanding goals as well as activities through which students can demonstrate their understanding by performing tasks in novel situations by transferring their learning. For learning trips, the guided performance of understanding prepares students by modelling the design of an inquiry and helping them to understand the methodology of inquiry. The culminating performance of understanding is an activity in which students can engage in conducting an inquiry or even designing *fieldwork* to demonstrate their understanding of the methodology involved.

#### *Ongoing Assessment*

This forms the criteria and the kinds of feedback that students can get to help them assess their own understanding of the topics involved.

With these in mind, we began our design of the New Zealand Learning trip. After some discussion, we did not ask students to design a field work as the culminating performance of understanding but rather to conduct an orienteering exercise on their own in an assigned venue.

#### HOW DID THE TRIP GO?

The learning trip to New Zealand was successfully carried out and there were many teachable moments during the trip. Using the TfU framework and a conscious use of the language of the RVIP design (Choy,

Teo & Yap, 2007), we shall highlight a few of the learning moments in the vignettes below:

#### Glaciers of New Zealand

*Students had the opportunity to understand the physical landscape in New Zealand, in particular, the South Island, during their visit to the Franz Josef Glacier. This was a unique voyage that began with a relaxing and interpretive walk to the glacier conducted by the guide. The trek was a perfect opportunity to learn the role of the Franz Josef Glacier in shaping this remarkable landscape.*

*Students not only understood the process that shapes the glacial landscape and the constituents of a glacier, they gained the experience of trekking along the river to reach the facade of the Franz Josef glacier. Their close contact with this physical phenomenon helped to make the new topic interesting. Students used observation skills to describe the change in vegetation near the glacier environment. To enrich their knowledge on glaciation, water samples were collected and temperatures were taken at different sites, namely at the river where the glacier was and at a river that had no glacier. Student A collected the temperature reading, commented on the coldness of the water and her observation was instantly verified by her findings. Student B collected the water sample from a nearby stream and exercised immense patience due to the low water velocity.*

*Water samples and temperature data were brought back to the hostel for further investigation. After dinner, students engaged in experimentation. They filtered the water collected from the two sites and dried the residue using an oven. They then attempted to weigh the residue and described and interpreted their results.*

Conversations with Michael Linton – An embodiment of ‘Habits of Mind’ (HOM)

*At the visit to the Giant Jersey, located in Geraldine, a historic town that is about an hour’s drive from Christchurch, students had the privilege to encounter a Mathematics talent who owned a shop that sold handmade knitted jerseys and yarn. With his passion for lifelong learning, he displayed great perseverance in inventing his own puzzle – a Tri-alphabetic puzzle encrypted in a giant mosaic artwork made of steel pieces – the Bayeux Tapestry. This mosaic, which graces the back wall of ‘The Giant Jersey’ workshop, is made from 2,000,000 pieces of spring steel. The mosaic measures 138 ft (42 metres) long and weighs in excess of 630 lbs (287 kg).*

*Students had a conversation with Michael Linton, the creator of this wonderful piece of artwork and puzzle (which remains unsolved to this day). As students listened to the personal account of the struggles and challenges encountered by this man of great passion for learning, they began to see the importance of some of the dispositions of a thinker. Many left the place inspired by the sheer determination and intellectual rigour demonstrated by Michael.*

An insight that fascinated us was the reflections and learning points that the students shared after their conversation with Michael Linton. The discussion turned out to be one of the most engaging and enriching ones in the whole trip.

#### INSIGHTS AND REFLECTIONS

Field study trips are intrinsic and essential as a teaching and learning tool for Geography. The study of Geography is enhanced by the opportunities offered in taking students to the field to see the ‘real-world environments and processes’ (Fuller, 2006). Through field trips, the understanding of geographical knowledge is attained in the throughlines and understanding goals of each itinerary.

For example, during the glacier expedition, students were given basic equipment to carry out the experiments. At first, they had to figure out how to fold the filter paper so that the residue could be trapped. There were no proper laboratories available, so learning was conducted in the dining area of the hostel. Despite the lack of a proper setting, the experiential entry point was evident. Working in pairs, Student A held a glass whilst Student B poured the water sample into the glass, waiting patiently for the water to be filtered. Then Student B placed the residue into the microwave oven in the kitchen to dry it. Although students knew that the water sample collected from the glaciated river contained more residues, they were eager to know the amount of sediment the sample could have vis-à-vis the other water sample which contained less sediment. The results of their experiment revealed that glacial water contains three times the sediment in non-glacial water. This performance not only enhanced their thinking skills but also allowed students to work on hypotheses and integrate their knowledge of Mathematics and Science to accomplish the hands-on investigation.

Through our observations of students' learning, we noted the importance of post-field trip discussions as they facilitated further learning and helped clarify doubts. Peer coaching was used and students began to develop their ideas, consciously using the language of Geography. The sharing and feedback given to the students helped them think about their own understanding and develop ways to improve their understanding. Not only was knowledge consolidated from discussions generated at the end of the day, students were able to build on what was learnt to reflect on and connect to past and current knowledge.

#### EXTENDING TO OTHER FIELD TRIPS

As seen from our trip to New Zealand, the TfU framework allowed teachers to plan performances of understanding that engaged students to act like geographers. This greatly enhanced students'

understanding of how a geographer works, and the connection between the modes of inquiry and the knowledge learnt in the textbook.

Based on our experience in using TfU to design the learning trip to New Zealand, we applied the TfU framework to design our field trips in 2007 as we could see the impact of learning beyond the classroom. The Humanities Department then tapped on the experience of the New Zealand trip to plan their Geography learning trips to West Malaysia and the United Kingdom in 2007.

#### Going Beyond Field Trips

We have since extended the TfU framework to other learning trips and immersion programmes. Using the idea of generative topics, we are able to draw upon connections between different subjects. This not only breaks down the boundaries between different subjects but also helps students see how knowledge is constructed in the various subjects.

Using similar generative topics of “What makes ...”, we were able to draw comparisons of the cultural, political, economic, social and physical aspects of the different countries. This enabled our students to understand and appreciate the similarities and differences in the challenges facing different nations and thus develop a stronger rootedness to Singapore.

An important improvement that was made to the New Zealand trip was the inclusion of initial performances of understanding before the trip to find out students’ prior knowledge so as to engage them to start “thinking about” the understanding goals of the trip. This also set the stage for the teacher to develop guided inquiry that could better engage the students during the actual trip.

The Shanghai–Suzhou Immersion Programme conducted in 2007 was a good exemplar of the modified TfU approach to planning learning trips. This improved model is closer to how TfU was used to plan lessons

in the classrooms and so further enabled students to see learning trips as opportunities to learn beyond the classrooms.

#### Shanghai-Suzhou Immersion Programme (2007)

Using the generative topic of “What makes China?”, the teachers designed a series of performances of understanding to help students understand the similarities and differences between China and Singapore, in terms of history, culture and learning environment. As can be seen from the vignettes below, TfU has transformed the nature of learning trips. Students were engaged using modes of inquiry in an authentic learning environment as they began to discover more about China during the immersion.

The students attended lessons with their Chinese counterparts in Suzhou Lida School (SLS) and Shanghai Nanyang School (SNS) during the immersion. In Suzhou, the students were each paired with a buddy from SLS. The students attended lessons alongside their buddies. Lessons were taught in Chinese and it was a novelty and challenge for them but with an open mind and willingness to embrace new challenges, the students acquired much knowledge in various subjects. They found the lessons on Chinese history particularly engaging. More significantly, they witnessed the enthusiasm of the Chinese students and their interactive learning culture in the classrooms, where they listened to different points of view and made their interpretations and inferences. Many were inspired by the SLS students’ high level of self-motivation and sense of purpose in learning. Through informal conversations, the RVHS students learnt about the Chinese education system from their buddies and became aware of the keen sense of competition in the secondary and high schools there.

Over in Shanghai, RVHS students interacted with SNS students four years their senior and gained a better appreciation of the strengths of Chinese schools. They observed either a Chinese or English lesson. Students from the two schools also participated in a lively discussion forum as part of their guided performances of understanding, to understand more about each country’s lifestyle and learning

culture. The forum was successful as measured by the students' ability to articulate experiences and give appropriate responses. This visit was a good start to establishing a partnership for future collaboration between the two schools, so as to enhance the learning experience of our students.

Not just an excursion

To complement the school immersion programme, organised visits to the many places of interest in Suzhou and Shanghai broadened students' understanding and fostered a sense of the cultural and historical depth of China. The TfU framework was used to design some of the activities at the various places of interest. A key performance of understanding and ongoing assessment is the reflective journal and the sharing of their own learning points.

Through the daily debriefing session and reflective journal, students shared their learning experiences and displayed certain attitudes (habits of mind), skills, and knowledge. For example, they understood the value of perseverance when attempting the craft hands-on session at the embroidery centre and the history of the war at *Sha Jia Bang*, where the Chinese displayed patriotism for their country.

Another guided performance of understanding required students to complete the worksheets on various places visited during the learning journey, after discussion with group mates. Throughout, they demonstrated curiosity and a passion for lifelong learning.

#### THINKING AND UNDERSTANDING A DISCIPLINE

Our experiences in New Zealand, United Kingdom and China demonstrated the value of learning trips as a means to understand and think more deeply about a discipline in an authentic learning environment. Through the use of performances of understanding to design activities that engaged students in disciplinary thinking, they had opportunities to act as experts in the field, making

connections between what they had learnt and how the knowledge could be applied. Learning came alive for the students and they demonstrated their growth of understanding during the trip. This move towards disciplinary thinking will certainly improve students' understanding from surface understanding of content to a deep understanding about the ways of knowing in the different disciplines.

#### Ways of Knowing in History – Social Inquiry

Students from RVHS have been participating in the Singapore–Thailand Enhanced Partnership programme since 1998 and have benefited from the learning trips that emphasize developing a deeper historical and cultural understanding of Thailand. Since the introduction of the TfU framework to design our Integrated Programme, teachers have been able to further involve the students in making the learning trip even more beneficial to their own learning process.

In 2007, the generative topic of “What Makes Thailand?” guided students in getting to know Thailand beyond what they have learnt from the textbooks. At the actual sites, they were able to practise social inquiry to “re-create” for themselves a better understanding of Thailand’s rich historical past. This was supported by questions that were crafted from the understanding goals for this trip. The students listened to stories told by the local guides, read up on local write-ups of past events, and sought to piece together the historical events that took place at the sites they visited.

After each day’s journey, the students would gather for a debrief session, facilitated by the teachers. Together, the teachers and students would discuss and assess the day’s findings and observations. During these sessions, teachers modelled the way to ask questions in History and made connections about what they observed to what they had learned in the classroom. Students demonstrated their understanding of the social inquiry method by using these knowledge skills in subsequent performances of understanding as exemplified in the vignette below.

At one session, the students shared their experiences at a village. Before the group arrived, the students were told to buy some goodies that would be distributed to the children at the village. Although the students had fun playing with the Thai children, they observed that the children seemed to be used by the adults to draw in tourists, and that the children had grown dependent on the handouts given. The students reflected about the situation with sadness and a tinge of anger, and a short debate ensued among the group members on the exploitation of children for economic gain. Such sessions were good performances of understanding, where teachers and students evaluated their learning and provided more input for each other's learning process.

#### Experiencing Knowledge

During a trip to Japan in 2007 under the generative topic of "What makes Japan tick?", students visited the Nagasaki Atomic Bomb Memorial Museum to understand the after-effects of the atomic bombing on the local people, both physically and psychologically, and sought to understand the importance of peace keeping. Through their observation of the sights and sounds of the Epicentre and the Peace Memorial Park, students experienced the feelings invoked by the event. It was an unusual way of experiencing and learning history.

Acting as historians, students had the opportunity to interview a survivor of the atomic bomb and another survivor of the Minamata Disease. Through the sharing of life experiences, the students were able to construct their own understanding of the events and the impact of these historic moments.

Throughout the trip, the students had many opportunities to carry out observations, draw conclusions and make reflections through discussion, sharing, listening to explanations and reading on their own. Learning became alive as they explored and made discoveries that could substantiate what they had learnt in the classroom. They enjoyed the process, rather than solely reading and remembering from textbooks.

One of the students wrote the following in her reflection:

One of the main learning points that I have gained through this trip is a better understanding of how war causes tragedy to Man. The visit to the museum in Nagasaki showed me the aftermath and the horrors of war – the ruins of the city, the injuries of young children. For the first time, I truly sensed the pain and agony death brings about. Unfair as it seemed to the people of Nagasaki, who were all innocent, I feel that war and conflict is sometimes unavoidable, if not, necessary, for the sake of peace. Man is selfish, and everyone would always want the best for himself, his family, and his country. Regarding WWII, I learnt that neither party involved in the war should be fully blamed, because they did what they were supposed to do, that is to defend their own people and country. Selfish and heartless should not be the words to describe either party.

Another learning point I had gained is to treasure life more. The two interviews with the war survivor and the Minamata disease patient knocked sense into my head, and made me realize how truly fortunate I was to have been born in a safe country like Singapore, without war and such terrible diseases. There were mixed feelings in my mind, seeing the two elderly people right in front of my eyes, telling me their very own stories about the saddening and painful experience they had gone through. Somehow, it seemed totally unbelievable that two elderly folks who had gone through a “living hell” would actually look so normal from the outside, as if nothing had happened to them before. However, after pondering and reflecting, I realize that both the war survivor and the Minamata disease patient are not just ordinary people. Through my eyes, I see two heroes, with extraordinary courage and willpower – heroes who did not give up and lose hope even though they were struck heavy emotional blows, heroes who had the determination to share their stories with the next generation, to prevent dark history from repeating itself. Their sad experiences made me realize that my own so-called “misfortunes” were nothing compared to theirs, and it really taught me to count my blessings.

As can be seen from the responses, engaging students in meaningful performances of understanding that involve the modes of inquiry relevant to the subject can help students appreciate and understand the content more and this can bring learning beyond the textbook.

#### CONCLUDING REMARKS

This paper provides a guide to using TfU to frame the students' learning experiences beyond the classroom. Extending the TfU to designing our overseas and local field trips and immersion programmes, we have since improved on our approach to curriculum design.

Students' performances of understanding, as demonstrated by their sharing and journal entries, clearly showed the students' ability to develop deeper understanding, beyond surface knowledge. They were able to seek connections across disciplines, demonstrate the mode of inquiry relevant for that discipline as well as peer-critique in reflections.

Displaying the ASK (attitude, skills and knowledge) that we desired them to have at the end of the field trip, we were heartened to note the power of using a good generative topic to facilitate transfer of learning. While the students might not have fully captured meaning-making in knowledge construction, they have developed a common language to examine different ways of thinking

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Annex 1: Example of a TfU Unit Plan for the New Zealand Trip



THROUGHLINES (ALSO UNDERSTANDING GOALS FOR THIS TRIP)

1.	QUESTION FORM	What physical features make New Zealand unique?
	STATEMENT FORM	Students will understand how the unique physical features of New Zealand contributes to the unique and beautiful landscape of New Zealand and how these features are used for tourism. They will also appreciate the sciences behind the formation of many of these features and how different elements such as climate, weathering, chemical reactions and human intervention impact the physical environment.
2.	QUESTION FORM	How does the rich historical past of New Zealand make it unique?
	STATEMENT FORM	Students will appreciate the rich historical past of New Zealand and how the Maoris strike a balance between keeping their rich cultural heritage and keeping in touch with the modern world.
3.	QUESTION FORM	What is so unique about the people of New Zealand?
	STATEMENT FORM	Students will appreciate some of the dispositions of thinking as demonstrated by many New Zealanders that makes them successful in their own fields of excellence. New Zealanders are known for their enterprising and risk-taking nature manifested by the different thrill-seeking activities that one can experience in New Zealand.

GENERATIVE TOPIC

What is your Generative Topic?

What Makes New Zealand?

New Zealand is a country in the south-western Pacific Ocean consisting of two large islands (North Island and South Island) and many much smaller islands, most notably Stewart Island and the Chatham Islands. New Zealand is also known in Māori as Aotearoa, which is usually paraphrased in English as *Land of the Long White Cloud*.

New Zealand is known as a popular destination for tourists and is often considered

one of the most unique tourist destinations. What makes New Zealand? At the end of the Learning Trip, we hope to understand and discover what is that unique thing that makes New Zealand “New Zealand”.

UNDERSTANDING GOALS (Which unit-level Understanding Goals are targeted by each performance?)	PERFORMANCES OF UNDERSTANDING (What will students say, do, or make to show that they understand?)	ONGOING ASSESSMENTS (How will you know they understand and what evidence is the assessor looking for? Give examples of what an assessor might expect students to do or say or what criteria an assessor might use to assess student work (products, presentations...)?
UG1, UG2	<p>Expedition at Mount Eden</p> <p>Students will be given information and rock samples of the different types of rocks that make up the island of Auckland. They will learn to recognise the different rocks and understand their formation by using them to explain some of the features observed at the site. They will do sketches of Mount Eden and represent what they think Mount Eden would have been like when it was first discovered. They will also play a game to help them recall the various types of rocks. They will then hold a discussion of their findings and learning points at the end of the day</p>	<p>Pupils’ feedback</p> <p>Feedback from Guide</p> <p>Feedback from teachers</p>

UG1	<p>Expedition at Franz Josef Glacier Students will explore the Franz Josef Glacier and learn about the formation and erosion caused by glaciers. They will study how glaciers shaped the environment by collecting data on the sediment type, temperature of the water, flow of the water, shape of the rivers, and an observation of the landscape around the glaciers. They will then analyse their data and present them verbally. A discussion will be held to consolidate their learning points.</p>	<p>Pupils' feedback. Feedback from Guide Feedback from teachers</p>
UG3	<p>Visit to Michael Linton Students will visit Michael Linton of the Giant Jersey Shop at Geraldine, a small town in New Zealand, off Christchurch. They will have conversations with him to find out more about his work and interests in creating and solving puzzles. They will try to reflect upon the thinking dispositions that Michael displays in his quest for knowledge. Students will then discuss their learning points.</p>	<p>Pupils feedback Feedback from Guide Feedback from teachers</p>
UG1, 2, 3	<p>Orienteering at Christchurch Students will conduct an orienteering walk in Christchurch city to observe flow of traffic, design of buildings, land uses, settlement pattern, transport network etc. They will discuss their findings.</p>	<p>Pupils feedback Feedback from Guide Feedback from teachers</p>