



Multi-dimensional Time, Multi-layered Outputs: A Win-win Solution to the Research-teaching Dilemma

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ABSTRACT

A multi-disciplinary team in the Faculty of Business at UNITEC is conducting a research project in which multi-dimensional time is explored from an individual and organizational perspective. Each member of the team introduced an extra standard classroom activity for eight weeks across six different papers from level 3 to level 8. Paper topics included Systems Analysis and Design, Data Communication and Networking, Strategic Management of Information Technology, Problem Solving, Data, Communication and Research Methods in Computing. For the duration of the project, team members kept a time diary for the extra classroom activity. They recorded time spent on planning, executing and analyzing the extra activity, as well as individual perceptions on the value of extra time spent (over and above) normal teaching duties. Preliminary results suggest that: teaching practices improved through collaboration with other team members; students' barriers to learning were discovered earlier, regardless of the paper topic; research skills were enhanced by working with an experienced researcher as team leader; research in the classroom informed the teaching and learning for all involved; time

management of all team members improved through sharing effective practices; resentments towards organizational time pressures were reduced as problems were discussed and solutions found within the team; and individual time management improved through shared knowledge and peer pressure to perform.

Keywords: Computing education, time management, computing research

1. INTRODUCTION

In this paper the first activity cycle (AC) of a multi-layered action research (AR) project (TReST) (Time for Research, entrepreneurship, Service and Teaching). The TReST project has been set up to investigate the multiple time dimensions and the multiplicity of demands placed on teaching staff as they endeavour to align themselves with the strategic direction both within SCIT and the Faculty of Business (FoB).

The REST (Research Entrepreneurship, Service and Teaching) model has been adopted strategically by the FoB. Each academic within the FoB is required to perform a mix of duties within REST. For most academics the main focus remains with teaching. Whilst there has been resistance to incorporating REST at an operational level, research outputs in SCIT



have escalated in the last five years as a direct result of this strategic direction.

With ever-increasing demands to improve research productivity and at the same time maintain high teaching standards, a multi-disciplinary focus group of academics within the FoB at UNITEC has been exploring the complex and dynamic nature of time. An 11-step action research project (TReST) has been designed, planned and implemented through its first AC to date. Data gathering, analysis and interpretation of time-related data as well as analysis and interpretation of content data is discussed in this paper.

The unexpected outcomes across the focus group (a major characteristic of AR) informed and modified the process during each step of this first activity cycle. Future directions for TReST include comparative studies with other institutions, a wider cross-section of taught topics and a closer analysis of the multiple dimensions of time.

2. PURPOSE OF TREST

With the ever-increasing demands to improve research productivity and at the same time to maintain high teaching standards, a multi-disciplinary focus group of academics within the Faculty of Business at UNITEC has been exploring the complex and dynamic nature of time.

The TReST project was instigated for the following reasons:

- ◆ to explore the way in which multi-dimensional time is perceived from both an individual and an organisational perspective;
- ◆ to arrive at recommendations that will benefit individual staff members, groups of staff members working in collaboration, SCIT and UNITEC and the wider higher educational computing field;
- ◆ To trial these recommendations in a pilot project; and
- ◆ To report these findings at each stage of the project.

The particular aims of the first activity cycle were to:

- ◆ up skill the self-selecting focus group in qualitative research methods, particularly action research and the reflective skills required;

- ◆ benefit in the short term by sharing best practice on managing both individual and organisational time;
- ◆ to participate in a collaborative research project that benefits both research teaching for all participating members; and
- ◆ to fine tune subsequent ACs with the outputs from the first cycle.

3. WHAT OTHERS HAVE DISCOVERED

In her study on teachers' interpretations of time Collinson (2000) found that time was multifaceted, complex, dynamic and nonlinear. The most important outcome from Collinson's study was a perceived need for a combination of discretionary time for staff to learn on their own and collaborative time to share. She also discovered that common time and common purpose in combination are much more likely to increase sharing than either one alone. A pressure for some teachers was the expectation that they continue to extend professional and personal time to accommodate individual learning and dissemination of knowledge. These conditions have been incorporated into the TReST study. Friedman (1999) discusses time as a one-way flow with both individual and organisational expectations. The TreST project echoes this one-way flow in repeating ACs. Incorporated in the objectives for TreST (Appendix 1) are both individual and organisational time expectations. Harung (1998) and Perlow (1999) suggests that a scarce- resource view of time is linear and fixed. In Perlow's study, changing the culture of the organisation from one of constant interruptions and rewarding organisational heroics, to sharing collaboration makes for a richer and more complex social time. Harung suggests that extending human development to utilise other states of consciousness means that individuals are able to take the course of least action, be aware of fortunate coincidences, take timely action and live in the present. In this more complex experience of time, intuition is enhanced, parallel processing improved and ability to delegate occurs smoothly. Heaney (2001) on the other hand stays well within the traditional framework of time management in considering forward planning, note-keeping and setting aside blocks of time. In the TReST project, an all-inclusive approach to the complex nature of time is considered. We are building a community of like-minded people (Handy,1999), we

are exploring social time (Lee *et al.* 1999) as well as clock time. It is interesting to note that social order within organizations is often dictated by the power associated with time availability, who waits on whom and what tasks take priority. The addictive nature of email has been discussed by Adria (2000) and strategies to deal with email have been adopted as a productivity tool within TReST.

4. RESEARCH METHODOLOGY

The original vision for research methodology (Appendix 1) was that this would be a qualitative research methodology that would be a combination of a core focus group, participant observation, open-ended interviews and individual time-keeping diaries. The research methodology would be closer to participative inquiry than a formal action research approach. However, the actual research methodology that has evolved through focus group interaction is more closely aligned to a formal action research approach. This became necessary to make best use of time available – a recursive theme in this project!

Formal data templates were developed within the TReST group to gather time data (Table 2), set in-class questions and give in-class feedback. These

templates allowed the group to standardise and at the same time allowed individuals to accommodate differences required for her/his own class.

The actual cycle adopted is shown above in Table 1. Other non-academic roles within the project (advisor, administrative/research assistant, brainstormer, and technical support) did not eventuate. As the skill base of the team increased, perceived skill shortages within the team at inception also did not eventuate. The team became collaboratively self-sufficient. Within the activity cycle (AC) adopted, both individual and group time were tracked.

4.1 TIME INVESTMENT FOR FOCUS GROUP

Each member of the focus group was required to:

- ◆ prepare context-dependent in-class written exercises;
- ◆ analyse the written responses;
- ◆ feedback time in class for students;
- ◆ prepare a report of the findings from using the series of exercises;
- ◆ each member of the focus group was also required to attend fortnightly focus group meetings.

Table 1: Activity Cycle

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- Step 1: TReST - form group
 - Step 2: Group - activity, design templates, data sheets, feedback format, reflection
 - Step 3: Team member – set own in-class questions
 - Step 4: TReST – discuss questions across disciplines, share ideas, revise questions
 - Step 5: Team member – revise own questions
 - Step 6: Class – team member tells own class about in-class questions (lesson 1)
 - Step 7: Students – responses to in-class questions written (lesson 2) (Table 3)
 - Step 8: Team member – analyse, interpret and prepare class feedback
 - Step 9: Class(or online) – deliver feedback to class (lesson 3 – or online)
 - Step 10: Students – access feedback (if online)
 - Step 11: TReST – share results with group, fine tune process, reflect

Note: all activities are timed and team members keep their own time data

Table 2
TReST Project Data Template

Name: _____ Class _____ Class No _____

Class Times: _____

Class Place: _____ Class Size _____ Responses _____

No of questions each session _____

Activity Cycle

	Tell Class	Give Question	Do Analysis	Give Feedback
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Date _____

Time _____

Reflection on Analysis and Feedback

Date: __/__/__ Time: _____

Your Feelings: _____

The Unexpected: _____

Summary: _____

Table 3
Time Results First Activity Cycle

Group Member	Tell Class	Give Question	Do Analysis	Give Feedback	Other
1	5min	15min	30min	40min	
2	5min	15min	15-30min*	5-7min*	
3	5min	10-12 min*	20-30min*	15min	15min data entry
4	10min	15min	30min	5min	
5	5min	15min	30min	10min	
6	15min	15min	2hrs	45min	30 min reflection
7	5min	15mins	4.5hrs	30min	30min (feedback online)

* per class - these team members had a number of classes for the question asked

5. DATA COLLECTION

The original plan was that data would be gathered from reports, contributions and feedback in focus group meetings, open-ended interviews with all members of the TReST team, and reports on individual time-keeping. It soon became evident that

standard data templates would be required. All members of the group had to make the distinction between time-related data and content data (the in-class questions). Reporting back to the group became more informal as trust developed during the semester.

Table 4

Group Member	Total Time min	Feelings	Unexpected	Summary
1	70	Satisfying to get early indications on student abilities	2-way feedback, tutor-student Fine-tuned teaching Students liked use of analogies	Identify weaker students early Motivation for students
2	40-57*	Hope that extra time worthwhile Enjoyed immediate feedback Time well spent	Problems from students in listening/reading/confidence Peer pressure from students for those not doing "homework"	+ve results on use of time by both tutor and students Tutor - emphasised reflection and analysis Student - need for time management
3	65-77	Student answers not up to tutor expectations	How much time required for analysis and feedback	Students benefitting Tutor understanding process more
4	60	Felt stupid - made a mistake with the question	Had to analyse 2 sets of results therefore	Most students on the right track
5	60	Gratified that all students did task Helped me to focus teaching more quickly	Surprised by how much students knew	Immediate feedback meant better use of in-class time Fine-tuned lesson accordingly
6	3hrs 45min	Students found ex thought provoking	Whole group remembered diagram summary and case study example	Best responses from EFL and mature students
7	5hrs 50min	Enjoyed doing the in-depth analysis	Realised that the process of research was demonstrated as well as doing this project	Didn't get 2-way feedback - block course, online feedback given

6. RESULTS

6.1 EXPECTED PROCESS

Analysis of results will be by content analysis of these diverse results. The aim in this paper is to capture the richness of individual perceptions on time.

6.2 ACTUAL PROCESS

All group members provided time data to the group leader to be collated (Tables 3 and 4). Table 3 provides a summary of linear time. It was much harder for some group members to report reflexively in this first AC. There was confusion with content results as opposed to time results.

7. INTERPRETATION OF RESULTS

7.1 EXPECTED OUTCOMES.

Expected outcomes for TReST were that:

- ◆ focus group members would discover own benefits and disadvantages of adopting a different teaching, learning and assessment (TLA) strategy;
- ◆ members would feedback to the focus group on an ongoing basis on effective strategies adopted in class;
- ◆ members would also feedback into the group their perception on the multiple dimensions of time;
- ◆ reports and papers would be produced by the group both on the outcomes of the TLA strategies adopted across a diverse range of topics and their perceptions of time usage in this context. Each member of the TReST team would produce at least two conference presentations and one refereed paper; and
- ◆ the facilitator would use CDCM (Fielden & London, 2001) to interpret the multiple layers of results to be reported in the wider IT and systems community.

7.2 ACTUAL OUTCOMES

The demographic data was easy for all group members to collect. It turned out to be more difficult for all group members to differentiate between content results and time-related results. At the focus group meeting to conclude the first AC (step 11, Table 1) all group members reported positive outcomes for individual teaching strategies - fine-tuning teaching based on immediate feedback, getting to know students earlier in the semester, and early preparation for presentations and exams.

All group members also reported that they regarded the extra time spent as a benefit for teaching. The extra benefit of developing research skills is emerging slowly. Individual flexibility in carrying out the first AC also emerged. This individual flexibility did not affect the overall process for the group, so no global changes emerged for subsequent ACs.

8. WHERE TO FROM HERE

This particular project will carry on for the rest of first semester. Also, a comparative study with one other institution is currently being investigated and further cross institution projects are planned. Outcomes from this project are informing strategic decision making within SCIT and FoB to benefit individual staff members, groups of staff members working in collaboration, UNITEC and the wider higher educational computing area. More in-depth analysis and interpretation on the multiple dimensions of time in higher educational institutions are also planned.

9. CONCLUSION

In this paper the complex nature of multi-dimensional time have been explored using a multi-layered research project. Integration of teaching, learning and research has been achieved for both focus group members and students through the use of in-class questions.

The content of the questions and the feedback provided enabled teaching activities to be honed at the same time as TReST members were developing qualitative research skills. An extra layer of learning was achieved in one class where the topic being taught was research methods (Fielden, 2002).

Sharing of best practice in time management, sharing of individual time experiences devoted to TReST activities, and sharing of TReST group time for designing, planning, implementing and reflecting in a cyclic manner all helped TReST members to understand more about the complex nature and the multiple dimensions of time.

Multiple emerging factors for TReST after the first AC included: the experience of flow (Csikszentmihalyi, 1997) in individual TReST activities, the benefit of more immediate in-class feedback to both students and staff, a deeper understanding of the insidious and addictive nature of email, the necessity of finding both individual and group block-time to engage in the extra tasks required by the project, and the benefits of sharing best practice in time management.

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APPENDIX 1

Trust in TReST Project

Purpose of Project:

1. To explore the way in which multi-dimensional time is perceived from both an individual and an organisational perspective.

2. To arrive at recommendations that will benefit individual staff members, groups of staff members working in collaboration, SCIT and UNITEC and the wider higher educational computing area.

3. To trial these recommendations in a pilot project.

4. To report these findings at each stage of the project

Project Group:

Facilitator & Participant - Kay Fielden

Participants - May Goh, Henry Ren He, Beth Jenner, Gerard Lovell, Logan Muller, Shiu Ram, Hira Sathu

Advisor - To be nominated

Brainstormer - Keith Allpress

Administrative/research Assistant - To be nominated

Duties: To provide support with group administrative functions

Technical Support Assistant - To be nominated

Duties: to implement time-saving software

Methodology

The qualitative research methodology adopted will be a combination of a core focus group, participant observation, open-ended interviews and individual time-keeping diaries. The methodology will be closer to participative inquiry than a formal action research approach

Data gathering

Data will be gathered from reports, contributions and feedback in focus group meetings, open-ended interviews with all members of the Trest team, reports on individual time-keeping.

Analysis

Analysis of results will be by content analysis of these diverse results. The aim is to capture the richness of individual perceptions on time.

Interpretation

Interpretation of results will be done using CDCM (Context Dependent Cluster Model, Fielden & London,2001).

Task for Focus Group

Each member of the focus group will use a series of context-dependent in-class written exercises as a TLA tool. This will take place in semester 1 2002. The format of the in-class exercises will be decided in the focus group.

Time Investment for Focus Group

Each member of the focus group will be required to:

1. Prepare context-dependent in-class written exercises

2. Analyse the written responses

3. Feedback time in class for students

4. Prepare a report of the findings from using the series of exercises.

5. Each member of the focus group will also be required to attend fortnightly focus group meetings of 1-2 hours on a Friday afternoon starting October 12 at 1pm

Outcomes of TreST

1. Each focus group member will discover her/his own benefits and disadvantages of adopting a different TLA strategy

2. Each member will feed back to the focus group on an ongoing basis effective strategies adopted in class

3. Each member of the focus group will also feed back into the group their perception on the multiple dimensions of time

4. Reports and papers will be produced by the group both on the outcomes of the TLA strategies adopted across a diverse range of topics and their perceptions of time usage in this context. Each member of the TreST team will produce at least two conference presentations and one refereed paper.

5. The facilitator will use CDCM to interpret the multiple layers of results to be reported in the wider IT and systems community.