A trans-disciplinary community-based approach to education for positive behavioural change in young drivers as high risk road users

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Abstract

To achieve the goal of road-safe behaviour among youth, new educational approaches are required. Road safety research has identified that awareness-raising media campaigns and driver training programs have no, or even negative, impact on risk taking behaviour or the involvement of 16-25 year olds in car crashes. For this age group, external environmental factors identified by social scientists such as peer pressure, and youth culture where status is associated with excessive or extreme risk-taking, are compounded by biological factors. Neuro-scientific research indicates that brain immaturity in under 25-year-olds limits their capacity to control impulsive behaviour, and impedes the simultaneous coordination of thought and action required for the effective perception and safe negotiation of driving hazards. Designers of road safety education programs must also contend with adolescent disengagement in learning that is passive and/or has little relevance to their life-worlds. Based on the results of a recent pilot trial of a school and community-based young learner driver education program in South East Queensland that aimed to address these problems, an innovative inquiry-based trans-disciplinary approach to young learner driver education is proposed that engages learners as participants in curriculum design, implementation and evaluation.

Keywords

Risk-taking behaviour, road safety, novice driver education, adolescent learners, community-based education, evaluation

Introduction

Driver education and training programs aimed at reducing the involvement of under 25s in road crashes remain the subject of evaluative studies by Road Safety experts in corporate and institutional settings, globally. In Queensland alone for 2003 costs totaled 3597.63 million dollars (Australian), of which the largest proportion was the estimated cost of serious injuries, at $AU 2276.80 million, the third highest of Australian states and territories (Connelly & Supangan, 2006). Despite concerted effort from the Road Safety sector, this demographic continues to be statistically predominant, peaking with 16-17 year olds (Arnott, 2002). Research in the field has identified limitations and shortcomings in both the education and training programs themselves and in the methods used to evaluate them. The assertion in one recent study (Lonero & Clinton, 2006) that more effective education and training program would result if evaluation began during a program's developmental phase, rather than after its implementation, informed the approach to the design and evaluative study of the community-based driver awareness program that is the basis for the argument presented in this paper. That this program is community owned and driven, and was developed using a participatory design process has introduced a particular set of circumstances of significance to debates in this field. These are discussed below.

The BRAKE Driver Awareness Program

"BRAKE" is the acronym for Behaviour Risk Attitude Knowledge Education. The BRAKE Project was initiated in South East Queensland (SEQ) as whole-of-community response to the problem of the over-representation of its 16-25 year old residents in car crash statistics. The project received seed funding from the Beaudesert Shire Council, in-kind and voluntary support from state government services (Police, Ambulance, Transport, Fire and Secondary and Tertiary Education) and from resident corporate sector professionals (Occupational Medicine, Occupational Health and Safety, and Law). Local business owners also contributed in a variety of ways, and the local media supported and promoted the BRAKE course to community members. The "community champions" who led and drove the initiative were from the car crash frontline, i.e., Police and Ambulance services.

The initial 8-module course outlined below trialed with 16 year olds in the local state high school in November 2006 used existing Queensland Department of Transport resources, and pedagogy derived from "insight" training methods used with adults in Ambulance and Occupational Health and Safety fields:

8-module 2-Day Course (Phase One)
1. Introduction to program concepts with emphasis on the cognitive capacity of under 25s
2. Road safety with respect to various situations, with emphasis on necessity for road rules
3. Passenger responsibility, peer pressure and driver responsibility to passengers.
4. Fundamentals of driving: rationale and purposes of road rules, and consequences of non-compliance.
5. Introduces hazard perception testing (a future component of open licence testing).
6. Causes of crashes
7. Detailed consideration of common causes: poor decision-making leading to harmful road behaviours (overtaking, fatigue, speeding, drink driving)
8. Choice of motor vehicle: problems associated with not being able to afford to keep older cars in good condition.
Evening of Day 1 : Parent/Driving Mentor Workshop (Phase Two)
• Community awareness raising – overview of learner driver program
• Self-recognition of driving behaviour
• Strategies for effective learner driver supervision
• Commentary driving (hazard awareness).

This 8-module course constituted phases one and two of an ambitious 5-phase plan:

Proposed 5 Phase Program

Phase 1 involves schools teaching road rules, leading into insight training. Police present insight training utilising ATSB and QT documents and brochures. On-line training and web page sought for extended learning facilities.

Phase 2 parent/carer program focuses on effective strategies for practice supervision (positive behaviour modelling and positive reinforcement, and 'contracts') to support learner-driver development.

Phase 3 (the practicum) students and parents/carers are strongly advised to log 120 hours (20 more than the number required by in-coming legislation) of practice prior to obtaining licence. (Research and ATSB shows this can reduce novice drivers' chances of involvement in an accident by one third.)

Phase 4 Post-licence: A further 6 months of as much supervised driving as possible is undertaken, incorporating a continuation of the log book (the first 6 months being most dangerous period)

Phase 5 involves long-term monitoring and engagement of drivers until they reach 25 years, engaging them in the "BRAKE community"

Phases 3, 4 and 5 were proposed to cover the period subsequent to the issuing of a learner's driving permit, through to 6 months post-license, with www-based ongoing monitoring involving reinforcement of learning and self-reporting by program participants until age 25. By the end of this phase, a longitudinal study of the cohort was planned that would evaluate the program's long-term impact.

The context for learner and novice driver education and training

Reviews of learner and novice driver education and training and recommendations for change tend to occur at 5 or 10-year intervals, in line with government planning cycles. At the beginning of the new millennium many Western nations introduced new plans. For example, in the US, a review of 20 years of driver training reported that the1980s was a "devastating decade" for driver education following the federal government's withdrawal of school-age driver education programs from the list of road safety priorities established under the Highway Safety Act of 1981 (Palmer, 2001). Follow-up evaluations of the medium and long-term impact of its (discontinued) Safe Performance Curriculum Driver Education Demonstration Project in 1983 and 1986 that confirmed that benefits were small and short-lived appeared to justify this decision. By 1991 'quality' education programs were found in "only 5 or 6 states", where their continued delivery was due largely to the efforts of one or two committed individuals. In 1995 there was renewed US federal interest in the problem with the allocation of a substantial budget to support a research-informed approach to driver training design. The outcome was advocacy for initial and advanced skills training by credentialed driving instructors (Peck, 2001) with responsibility for monitoring driving behaviour to reside with parents who would supervise the learner driver during a graduated

licensing phase. However it was soon identified that mentor education would be required to support this system (Beck, Hartos & Simons-Morton, 2002).

Australian (Triggs & Smith, 1996) and European (Bartl et al, 2002) reviews conducted during the same period also supported the graduated licensing system but found that skill focused training alone – particularly at the advanced level – had no or even negative impact (Christie, 2001; Langford, 2002; Harrison, 2002; Bartl et al, 2002). In Australia the necessity for a multi-faceted approach to driver education and training was established, with Australia's National Road Safety Strategy (2001-2010:6) introducing measures for the improvement of "the competence and attitudes of novice drivers by increasing supervised driving practice, trialing, and if proven, expanding school-based learning initiatives and competency-based continuous assessment programs, and developing programs focusing on cognitive skills such as hazard perception and conflict prediction." Emphasis was placed on the role of schools and communities in education aimed at influencing the motivation of young drivers and their personal approach to driving, with additional support for driving mentors undertaking the supervisory role (Travelsafe, 2003; Senserrick, & Haworth, 2005). States and Territories adopted a variety of responses to the national strategy.

The BRAKE program is in the category of Community-based education (CBE), which is distinct from both Community Education (CE) and Institutionally-based Education (IBE). CBE is argued to be primarily "a form of social action within a community framework that extends beyond schools as institutions." CBE is considered empowering, in that it "allows community members to become self-oriented participants in the creation of the learning environment"; and is said to be likely to be "more dynamic" (than either CE or IBE) (Corson, 1998:238). Participatory Design (PD) is a process pioneered in Scandinavia in the 1960s by computer systems engineers, that recognises "the importance of perspectives, interests, conflict and participation among multiple expertise standpoints in the design process" (Levinger, 1998).

Relevant theories of learning and teaching

A commonly held view in the field is that training is concerned with 'know how', that is, the practical application of knowledge and the development of competencies, whilst education is concerned with 'know what', that is, knowing 'about' a particular topic. This polarized view was dismantled in the European research projects GADGET, which elaborated a philosophy for driver training, and ADVANCED, which inquired into whether behavioural change was being achieved in novice driver education programs (Bartl et al, 2002). Based on extensive analyses of driver training and education programs throughout Europe and the US and studies that included observations of courses being taught and surveys of participants, ADVANCED defined post-license training as "the process that amplifies, and provides a context for, learning in three key areas … knowledge and how to apply it; skills learning that is 'hands on'; and learning at the level of attitudes and values". Learning (which could be physical, emotional or intellectual) was described within the same context as "change in the trainee's knowledge, skill or behaviour (as dictated by his/her values and attitudes)" (Bartl et al, 2002:39).

Arnett (2002) argues that different approaches should be taken with learner and novice drivers that take account of developmental differences across the 16-25 age range. He proposes that researchers treat adolescence (10-17) and emerging adulthood (18-25) as two distinct categories with distinctive sources of risk. In adolescence, sources of risk are argued to be the

power of friends, optimistic bias, and emotionality, while for males emerging into adulthood, risk is linked to (American) constructions of manhood.

The selection of learning experiences, teaching approaches and assessment practices are significant factors of influence in outcomes. Recent education research has shown that programs that involve participants in 'authentic' learning experiences (rather than in simulations or games) are more likely to lead to deeper learning. Inquiry, or problem-based learning that is values-focussed and engages students philosophical debates on matters of moral and ethical import is argued to develop higher-order thinking skills (Wilks, 2004). As the areas of the brain responsible for self-control, judgment and emotional regulation are still being restructured in teen years, early intervention in the middle years of schooling (ages 10-15) is crucial.

"Insight training", the pedagogy underpinning the contributions to the first and second phases of the SEQ BRAKE course by occupational, road safety, and health professionals, has currency in these fields but not in schools. Schilling's (2005) recent attempt to construct a theory of how insight works is instructive for educators working with adolescents because it explains why insight yields an affective response in the individual. Of significance is that the affective domain is the locus of attitude (Schilling, 2005), Much emphasis is placed on negative affectivity in the context of risky behaviour by teens attributed to sensation seeking (Desrichard & Denarie, 2005). A perspective highlighted by Schilling's study that is congruent with the way that insight is thought of in the field of occupational safety is that efficient insight relies on the development of accurate patterns of association. This idea is aligned with the view that an intrinsically logical process is followed, whereby an individual sifts through possible representations in search of a solution to a problem. (The BRAKE Program in SEQ adopted the metaphor of the "CD stacker" and the concept of cognitive tunneling for explanatory purposes.). Outside of the field of occupational safety, insight research is dominated by creativity and innovation theorists, including Schilling, who is concerned with the contribution of non-rational (intuitive, sensorial, and artistic) ways of knowing and understanding the world. In the discourses that focus on the re-engagement of adolescents, learner-centred, active, creative, philosophical inquiry-based ('productive') pedagogies aimed at higher-orders of thought and informed decision making have currency.

An important consideration in learning design for road readiness is how to develop in adolescents the capacity to recognize hazards. Hazard recognition begins with the attentional process required to discriminate a target item from distractors (LaBerge, 1997). In LaBerge's conceptualisation, the capacity to perceive and 'read' indices (e.g., of hazards) is what prepares us for an expected stimulus, and is therefore a crucial precursor to awareness. Awareness, a primary goal of learner driver education, requires "the simultaneous activity of three brain regions that are interconnected by a triangular circuit (cortical site of attentional expression, the thalamic enhancement structure, and the prefrontal area of attention directed to a representation of the self") (LaBerge, 1997:149). A further factor in our ability to respond to hazards whilst driving is technological embodiment. By this is meant our bodily familiarity with the vehicle whereby self and object (car) become one, exemplified in our capacity to park a car in tight space, knowing instinctively that it will fit. Thus embodiment is an important aspect of understanding as well as skill development that links perception, thought, and action.

Research comparing adult and adolescent brain activity shows significant differences in perception. For example, a recent large study found the frontal lobe of teen brains (frontal

lobes being the locus of goal-oriented rational thinking) to be less active than those of adults undertaking the same task, while the amygdala (a structure in the temporal lobe that is involved in discriminating fear and other emotions) was more active. In this study, facial expression interpretation tests identified that teens (especially those under the age of 14) often misread facial expressions, perceiving sadness or anger or confusion instead of fear, while older teenagers answered correctly more often, exhibiting "a progressive shift of activity from the amygdala to the frontal lobes" (Yurgelun-Todd, 2002).

Brain Regions and functions	
Frontal lobe	self-control, judgment, emotional regulation; restructured in teen years
Corpus callosum	intelligence, consciousness and self-awareness; reaches full maturity in 20's
Parietal lobes	integrate auditory, visual, and tactile signals; immature until age 16
Temporal lobes	emotional maturity; still developing after age 16

Source: ACT Research Facts and Findings (2003)

Because judgment, insight and reasoning power of the frontal cortex is not being brought to bear on tasks by teens as it is in adults, they process information differently (ACT, 2003), and this has important implications for communication design. Tilleczek's (2004:1) study of youth driving culture concurred with this assessment, identifying systemic flaws resulting in "mixed messages, missed opportunity for integration, lack of clear regulation, and society's negative images of youth", whereby youth are perceived to *be* the problem. This point of view assigned individual blame to youth as risk-takers, resulting in misguided prevention efforts. Moreover, studies of how we cognitively process consequences of certain behaviours have identified strong links between self-efficacy (or beliefs about self-efficacy) and positive behavioural change. Because individuals process, weigh and integrate information concerning capability from diverse sources of information, an integrative theoretical framework is required to explain and predict psychological changes achieved by different modes of intervention (Bandura, 1977:194).

Program design considerations

Considerations in the conceptualization of the intervention were based on a review of the literature on road safety education and training evaluation, which identified that:
  I. irrespective of variables, skills-training has not impacted positively: media campaigns aimed at raising awareness and discouraging harmful driving practices – particularly fear-based strategies - are ineffective in reducing common causes of fatal crashes (Shanahan et al, 2000; Tay & Watson, 2002);
 II. personality characteristics such as sensation-seeking and negative affectivity are indicators of risk-taking behaviour (Desrichard & Denarie, 2005);
III. in teens, the judgment, insight and reasoning power of the frontal cortex of the brain does not appear to be brought to bear on the driving task in the same way as it is in adults (ACT, 2002);
 IV. teens process information differently from adults (Yurgelun-Todd, 2002);
  V. more complex approaches that make links between age, sex, motor function, perception, cognition, disposition, action and control, and social situations are required (Tilleczek, 2004).

An inquiry, or problem-based pedagogy -argued to be more productive –was considered, with early intervention aimed at subsequent developmental phases. A supportive learning environment, with learning experiences relevant to adolescent life-worlds (advocated to engage learners), and strategies were sought that would facilitate the development of higher order thinking skills for deep understanding to result (Education Qld. 2000; Pendergast & Bahr, 2005; Wilks, 2004; Lipman, 2003).

A formative evaluation process (a familiar feature of school-based learning design) was proposed to enable on-going refinement to the program from the outset. Formative phase evaluation was identified as an oversight in program design in Lonero and Clinton's (2006a:41-2) report on the limitations of past driver education evaluations. Others were (i) *weak program theory* (the logic that justifies thinking a program should meet its goals) (ii) *lack of formative evaluation* leading to lack of clarity about how well learners achieve, retain and use desired skills and knowledges (iii) *methodological weaknesses*: problems of scope, design, sampling, and confounding comparisons (iv) *lack of systematic follow-up*: one-shot efforts that did not build from earlier work or try to answer questions raised by earlier studies. To remediate this situation they recommended "a wide range of data-gathering and research methods related to the evaluation targets" including pilot testing, content analysis, focus groups, "standardization (benchmarking, certification and auditing) instrumented vehicle observation, questionnaires, surveys, record studies and modeling, ecological studies, longitudinal studies, quasi-experiments and randomized controlled experimental trials". These methods were introduced within a 5 level evaluation framework with the first level consisting of relatively simple, formative evaluation activities: "describing the program, setting program goals and objectives, and identifying evaluation objectives, questions and targets for improving the program"; "benchmarking the program against industry standards or surveying customers to determine satisfaction levels"; "examining instructor qualifications, the uniformity of instructional delivery, and other operational matters."

Study scope and intent

The present study approximated Lonero and Clinton's (2006a) recommendations for a level one (formative) evaluation. It was multi-dimensional, covering most aspects of the evolution of the initiative, with a variety of instruments used to collect quantitative data (from simple course evaluation surveys through to Likert-scaled pre- and post- course questionnaires) and qualitative data (from focus group discussions, interviews, observations, informal reports, field journal entries through to self-reported reflections and meeting notes). Evaluation instruments and the program itself were refined, adapted and expanded during the period of the study (March 2006 - December 2007). All data used in the evaluation were collected by the same research assistant during this period and fed back into the process. Thus the study makes no claims to objectivity. Its value is that it is descriptive of a bottom-up rather than top-down approach arising from a community-based response to the problem.

The study began at the point of the drafting of the initial course overview and formation of the program's design and delivery team. It followed the initial trial of phase one of the course with 16 year olds in a local state high school in the Shire in term 4, 2006, and a control group in a state high school in a neighbouring local government area with similar demographics. Course graduates were invited to volunteer for parts in the production of film aids for the program with a professional filmmaker that comprised a series of consequential sequences linked to driving decisions. Phases one and two of the evolving program (phase two being the parent workshop) were conducted subsequently on two occasions (January and March, 2007)

with 16-18 year olds who were not schooling and their parent/carers. A larger pilot trial was then conducted using refined materials and instruments with 4 nearby schools (3 state and one independent) and one state-school based control group during terms 3 and 4 of 2007. A table showing the variations in participant numbers and the program delivery contexts and modes during the pilot trial is appended hereto.

By documenting the transfer of the program to schools in the Gold Coast City local government area, it was hoped to identify the degree to which the program was idiosyncratic to the Beaudesert community, as well as the extent and nature of adaptations that would be required to transfer the project to another community.

Selection of Participants and types of data collected

The study sought to capture process and evaluative data in line with the project's overall goals from as many participants as possible in the overall initiative during the study time frame. All learners (school and community based) were requested to complete pre and post course questionnaires. Course participants were asked to complete a questionnaire at the outset (devised by the teaching team) that sought information about driving attitudes. A post-course questionnaire, also devised by the teaching team, sought participant evaluations of the course. Course graduates were invited to volunteer for parts in the production of film aids with a professional filmmaker that comprised a series of consequential sequences linked to driving decisions for future use by the team. Volunteers were recruited from among course graduates to participate in focus group discussions to occur 2 to 3 months post-course. Focus group discussions (2-4 per group) in response to the visual prompts related to the course content and concepts were recorded using digital video (in one instance) and audio equipment. The prompts were designed to test their level of knowledge of road rules, capacity to perceive hazards, strategies for hazard control, awareness of risk-taking behaviour and knowledge of strategies to avoid involvement. Unstructured interviews were held early and late in the study with The Program's development and teaching team members.

Both the course and the evaluation instruments were refined during the 2006-7 summer vacation for delivery with two community-based learner driver groups aged between 16 and 19 in January and March 2007. Parent-carers participating in the workshop at the community courses were invited to volunteer to be interviewed.

During a subsequent pilot phase, a study was undertaken of the implementation of the intervention in 4 schools (research contexts A-D) and with one school-based control group (research context E). A refined Likert-scaled pre-intervention questionnaire was administered, and responses sought to an on-line post-intervention questionnaire or to a hard copy version that was also made available. Volunteers were recruited from among course graduates to participate in focus group discussions to occur 2 to 3 months post-course. The course implementation schedule, participation numbers, focus group schedule and brief descriptions of the contexts and associated variables is appended hereto.

Program co-ordinators in these new contexts, as well as teachers and school principals were invited to participate in audio-recorded unstructured interviews reflecting on implementation issues and recommendations for future approaches. These sought to elicit feedback on the program, its efficacy; and other information that would provide insights into the degree to which the program was idiosyncratic to the Beaudesert community as well as the extent and nature of adaptations required to transfer the project to schools in another community.

A critical friends group was formed to participate in a forum and plenary session to respond to study results and make recommendations based on the program's goals.

Methodology

Because the evolving SEQ BRAKE Program was multi-layered and courses were taught in multiple contexts by a team of professionals from several disciplines, the views of these multiple stakeholders were perceived to be as critical as those of school students, learner-drivers, parents or carers and the general community. Therefore a grounded theoretical approach (Strauss & Corben, 1998) was used to enable conceptual and analytical frameworks and an understanding of the program's logic to develop alongside The BRAKE Program, with instruments and approaches continually adapted on the basis of feedback.

The model adopted for the study was Ecker and Baker's (1984) *Multiple Perception Analysis Convergence Model* (MPA-C). This model was chosen because it supports the integration of qualitative and quantitative evaluation and attends not only to the educational, but also the social, and psychological dimensions of a learning situation. These features enable responsiveness to changing educational contexts, and sensitivity to the evolution of learning over time.

In the MPA-C model external experts are connected to internal/local stakeholders in the development and delivery of a program. The perceptions of all participants are recorded in a non-hierarchical format. This data is then subjected to a cross-disciplinary analysis. Inter-subjective verification of perceptions is achieved through independent reviews of audio and video recordings, interviews, observations, and questionnaires. Converging and diverging perceptions are submitted to participants for their responses, and the final multiple perception analysis (MPA) submitted to an external review panel of 'critical friends' for validation.

The quantitative data from the questionnaires and surveys was subjected to SPSS™ statistical analysis and multivariate testing with the aim of finding evidence of the program's immediate impact. Qualitative (subjective) data from focus group discussion and interview transcriptions were subjected to semantic mapping using Leximancer™ software to enable themes and issues to arise from the data itself. The videotapes of the focus group discussions following the first intervention (November 2006) were subjected to conversational analysis in addition to the transcription and semantic mapping of the spoken conversation. Conversation analysis focuses on the organisation of talk and how participants co-construct social reality in their interactions. Central to this approach is the assumption that meaning and social context are mutually constructed by participants through talk-in-interaction.

Discussion of study results

It is beyond the scope of this paper to elaborate fully on the data collection and analysis processes, to critically evaluate the reliability of the instruments, or to provide the overall results of the study. These aspects will be reported on in detail in ensuing publications. The results selected for discussion here are the only two instances that might suggest that there was any positive impact – focus group dialogue from the initial implementation school (November 2006) and that of one pilot trial school (context C, November 2007). The discussion will focus on possible reasons in the context of the broader research from the fields of Road Safety and Education that examines the characteristics and capacities of this target

group. The discussion begins with a brief reference to the quantitative data from the pilot trial.

A quantitative measure for immediate impact was devised and applied in the analysis: 16 year olds' capacity as passengers to identify appropriate and inappropriate driving behaviours, driver choices and safe driving by driving mentors in a 3-part 5 point likert-scaled (A & B strongly disagree > strongly agree; C none > extreme) in identical pre and post-intervention questionnaires administered to course participants. The same questionnaire was administered to the control group. Of the responses to the 3-part questionnaires). The responses by intervention and control groups to Part A were combined, then compared with the post-intervention responses resulting in differences that were interpreted as increased passenger awareness, post-course, of risk taking by their most frequent drivers (See Tables One and Two appended hereto).

However an important contextual consideration in making claims about attitudinal or behavioural change based on data collected using quantitative instruments is the cognitivist ideological bias of questions about intentions in pre-practicum phase education. As psychologist and social theorist Edward Sampson warns, cognitivism "substitutes thought for action and mental transformations for real-world transformations" thereby "veil(ing) the objective sources and bases of social life and relegat(ing) individual potency to the inner world of mental gymnastics" (Sampson, 1981:735). In simple terms, asking an individual to articulate what they think they would do in a given situation requires complex cognitive processing. Inner thoughts must first be brought into consciousness then expressed through language. Testing for what an individual knows and will do based on verbal or written responses in isolation from the real-world context for the required action is contingent on the individual's intellectual capacity to provide this form of response. Furthermore, there is no guarantee an individual will translate thoughts into action in any case.

A qualitative measure of positive medium-term impact applied in the analysis was 16 year olds' capacity, in focus groups with 2-4 participants, two to three months post-intervention, to engage in substantive conversation with peers in response to visual prompts (images depicting complex driving situations). Positive impact appeared to be evidenced in only one of the original formative evaluation focus groups (November 2006) and *one* only focus group from context C (the only independent school of the 4 intervention schools in the 2007 Pilot trial), and these instances will be discussed in detail here.

The semantic map of the focus group data from the original (November 2006) intervention context is illustrated in Figure One: *Semantic Map, Initial (Formative) Intervention Focus Group Discussion (Nov. 06)* appended hereto. In this instance, a conversational analysis of video sequences was undertaken in addition to semantic mapping. The conversational analysis focused on "the ways in which social realities and relationships are constituted through persons' talk-in-interaction" (Sacks et al., in Silverman, 2006: 40). This analysis considered turn-taking, sequence organisation, lexical choice and the overall structure of the conversation. A sample is appended hereto. This analysis highlighted the way in which each participant invited the other to respond in a series of elaborations, constructing mutual understandings of the prompts through their conversation. It found that the discussion itself constituted a stage in the learning process. Through discussion of the hypothetical situations the students reinforced their understanding of the concepts taught. An important emphasis apparent in the dialogue was the accountability attributed to the drivers themselves for their own safety, requiring them to be aware of the potential hazards in a given situation, beyond a re-iteration of road rules. The repetition of specific words, such as "have to", in conjunction

with the description of risks in each situation, indicated an imperative for the driver to be observant and aware of the risk factors. The software-assisted analysis of lexical choices highlighted the informal nature of the dialogue as the dialogue progressed. The participants expressed the concepts taught in the course in their own terms. Evidence of learned concepts was found in the application of an understanding of the rules and potential risks to unseen circumstances, revealing:

- depth of knowledge and understanding by 16 year olds of appropriate and inappropriate driving behaviours, driver choices and safe driving;
- depth of knowledge of road rules and perceived ability to apply this knowledge in diverse driving contexts; engagement in the process of driving as an active and critical passenger;
- ability to assess the hazard and risk potential in diverse driving contexts and to make judgments about safe driving practices; confidence to adopt assertive behaviours in peer driving contexts).

The context C Focus Group dialogue, recorded using audio equipment only, was transcribed and subjected to qualitative analysis using Leximancer ™ software tools to generate a Semantic Map of the discussion to assist with interpretation (Figure Two Appended hereto) Following the MPA-C model, analyses of all focus group data were interpreted in the light of additional contextual data derived from researcher observations and semi-structured interviews eliciting perceptions of developers and teachers.

The analysis of the focus group discussions appears to indicate that only 2 students in the first intervention (Nov. 2006) appeared to achieve deep learning, and then it can't be claimed that their knowledge was new or a result of the intervention. Although some evidence of knowledge gained about driving related to the course content was found in one focus group discussion (context C) it was not at the meta level (i.e. demonstrating an awareness of oneself as "an actor in his environment, that is, a heightened sense of the ego as an active, deliberate storer and retriever of information subseqently applied to mnemonic problems" (Flavell, 1971; Hacker, 2001, cited in Parker, nd:1)). Unlike the formative intervention focus group, context C did not discuss their rights and responsibilities as passengers to make safe choices in risky teen driving situations (presented in the film aids that supported the course).

These two learning contexts (initial and C) differed considerably from the other contexts in which the pilot study was conducted (see schedule of schools and associated variables in program and focus group conduct, appended hereto). Course participants in the initial implementation context had engaging learning experience through their involvement in film-making with professional to produce film aids for subsequent inclusion in the course materials. In the contextual data, positive outcomes were attributed to learner participation in the curriculum design process and active creative learning strategies that engaged the learners in the production of these teaching resources – a process that affirmed the significance of their contributions to the development of the course.

Pilot trial schools were not availed of the opportunity for this level of engagement. Furthermore teachers in the transfer trial had insufficient time to familiarize themselves with the ready-made materials in order to make links to other learning, nor did they have the opportunity to observe a course being taught by experienced Program teaching team members. By contrast, school C was able to optimise the intervention because of systematic differences (independent as opposed to state schooling system) that allowed timetabling

flexibility, enabling a two-day intensive course to be provided in a technologically-better-resourced and spacious learning environment. Additional factors of influence were the familiarity of the teachers in these two contexts with the curriculum intent because of their involvement in The Program's development, and hence their capacity to make links across the curriculum, (e.g., to their specialist areas of physics and law), and to use teaching strategies for multiple learning modes - particularly the kineaesthetic mode known to be favourable to adolescent learning.

Conclusions and recommendations

Multi-disciplinary, multi-modal opportunities for 'authentic' learning experiences relevant to 16 year olds' life-worlds (film-making, scripting and acting in scenarios related to images and contextual details of actual car crashes in the initial intervention) may have contributed to metacognition (deep learning) by the focus group participant who expressed strong intentions to adopt strategies to resist pressure to tolerate risky driving by sensation-seeking peers that were enacted in the film drama. However experience among this group in the post-license phase has confirmed Bandura's (1977:212) research findings that while perceived self-efficacy may influence performance, "expectation alone does not produce desired performance if the component capabilities are lacking", and this is also confirmed by car crash statistics that show that 6-months post-license is the period of greatest vulnerability. A further contention –that "there are many things that people can do with certainty of success that they do not perform because they have no incentive to do so" (Bandura, 1977:212) - is also recognized in the body of literature linking influence to motivation, for example, in youth risk taking which links disaffectedness with feelings of powerlessness (Desrichard & Denarie, 2005).

Extrinsic motivation (financial reward or penalty, and removal of license) may influence adult road behaviour. However in the crucial pre-license phase these strategies are not relevant. Recent research into the driving habits of 300 residents of South East Queensland located influence in the social domain of peer and familial relationships (Fleiter, 2006). As well, studies of learners in the compulsory years of schooling have, by necessity, sought to identify intrinsic motivational influences on social behaviour and learning. Overwhelmingly these studies point to learner empowerment as intrinsically motivational. These results confirm the position taken here that involving learners in the design of the educational experience and of the learning environment itself helps overcome known inhibiting factors: passivity and life-world irrelevance (Pendergast & Bahr, 2005; Burke, 2006).

Schools are embedded within the social fabric of communities and have a vital role to play in equipping children to deal with the responsibilities that come with citizenship rights. Philosophical inquiry is an approach that is gaining currency in schools because it "gets kids to think together so that that thinking, that externalised group thinking, interdependent thinking, can then be internalised into their own thinking processes … so it's a way of getting children to reflect on their own thinking, by thinking aloud and together" (Millett, 2005). Philosophical inquiry focuses on ethical dilemmas that are presented in a variety of ways – in fiction, in the media. In this approach questions are posed using visual and other artifacts as prompts to initiate discussion, debate, and informed and considered responses to such questions as "Can a motor vehicle or bike crash always be called a 'road accident'?" "When?"; "When not?"; "Who decides?" "With what consequence, and for whom?" Creative philosophical inquiry engages learners in the critical evaluation of a variety of information sources and formats; through a process of deconstruction, critical reflection and

reconstruction they can transform meaning as active participants and media producers. However access for adolescents in Education Queensland schools to such programs will require advocacy, based in research, that provides evidence of the contribution of a safety-focused curriculum to perceptions of the core business of schools, which is currently attuned to two key concepts: literacy and numeracy. A current curriculum imperative that can be addressed through inquiry-based learning 'about' road safety is the "multiliteracies" framework, which acknowledges the variety of 'text' forms and formats and modes through which communication and learning takes place.

To overcome the issue of cognitivist bias, a pre-practicum phase incorporating opportunities for learners to test new knowledge through practical application in the field and to share outcomes is recommended. Evidenced-based approaches that are active, creative, and relevant to the life-worlds of adolescents can be facilitated using adolescents' preferred (mobile) communication and (on-line) social networking modes. Adolescents are capable of self-organisation, and are highly motivated to form learning communities to share what they know and can do (my space, u-tube). GIS mapping systems are usefully incorporated into mobile devices, providing opportunities for pre-permit learners to record recognized hazards and strategies for managing them during commentary driving episodes with intending mentors. (Nalder et al, 2007).

To conclude, the SEQ BRAKE Program is only one of several initiatives in Queensland involving community-school-stakeholder collaboration (cf Queensland Transport supported L-Plates, DEEP, and Drive4Life) that are deserving of closer scrutiny and support for the levels of evaluation proposed by Lonero and Clinton (2006a) in the light of the shift to graduated licensing, and the legislation in Queensland requiring year 10 students to be "earning or learning", which has opened the way for students to "bank" accredited structured community courses toward the new Queensland Certificate of Education.

Acknowledgements

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Appendix One: Table One: Survey Questions

PART A My parents/carer ……	PART B My thoughts and beliefs	PART C Estimate the level of driving risk for each of the following:
They insist that all passengers wear a seatbelt at all times	I consider myself knowledgeable about road rules	Passengers not wearing seatbelts
They carry more than the designated number of passengers in the car	I value my parent/s advice about driving	Carrying more than the legal number of passengers in a car
They eat and drink while driving	I believe the greatest problem for me as a novice driver will be my lack experience, and knowledge	Eating and drinking while driving
They go through red lights	I plan to buy my own car	Going through a traffic light that has just changed to red
They drive when they are tired	I think that skill in handling a car is more important in avoiding having a crash than a cautious attitude towards driving	Driving when tired
They always indicate when turning	I think driving is a great way to relax	Not indicating when turning
They increase the distance between their car and the car in front in wet weather conditions	I cannot wait to get my licence and own my own car	Traveling with other young drivers
They keep both hands on the wheel while driving	I consider my parents are overprotective	Not increasing the distance from the car in front in wet weather conditions
They drive when they have had a drink of alcohol	I am nervous about driving	Not keeping both hands on the wheel while driving
They answer their mobile phone when they are driving (with or without hands free)	I avoid traveling with other young drivers	Driving after having a drink of alcohol
They obey the speed limits	I consider myself sensible and have a good awareness of the risks associated with driving	Answering the mobile phone when driving (with or without hands free)
They change radio stations while driving	I listen to my parents when they talk to me about safe driving practices	Driving 5 to 10 kph over the speed limit
They get annoyed by other drivers	I consider that logs books and supervised driving will make me a safer driver	Driving more than 15 kph over the speed limit
They cut in and out of traffic	I expect that my parents will place restrictions on my driving (e.g. curfew) when I have a licence	Changing radio stations while driving
They often talk to me about the hazards of driving	I think that young drivers are irresponsible	Getting annoyed by other drivers
They drive when they are angry	I believe the greatest risk for novice drivers are other more aggressive drivers	Cutting in and out of traffic
They permit me to travel with another young driver	I am looking forward to having a licence so that I can be independent	Distracting passenger behaviour
They tailgate other drivers		Tailgating other drivers

Appendix Two: Pilot Implementation Schedule & Variables						
Program delivery date	Research Site	Method of Program Delivery	Participants	Research Participant Category	Method of Data Collection	Result
Term 3, 2007	A	• Delivered by experienced BRAKE teacher (2nd delivery of program and teacher instrumental in developing BRAKE curriculum). (N.B. computer unable to run video components of program) • Intervention participants withdrawn from extra subject tuition lesson for Maths and English). • Duration: 10 weeks, 1 hour 15 minutes per week.	25 Began with 52 students participants concluded with 12. All pre-driving (n.b. only 1 participant had learners for focus group)	Year 11 Age range: 15yrs 9 mths - 15yrs 11 mths. (Chosen by school on the basis that they will be turning 16 on completion of program)	Pre-, post-, and 3 month post-questionnaire Focus Group- administered Research Assistant	
Term 4, 2007	B	• Delivered by teachers (3 modules) in collaboration with and two members of the BRAKE team (5 modules) • Component of the Year 11 weekly 'Seminar Program' • Duration:10 weeks, 1 hour per week	150	All Year 11	Pre-, post-, and 3 month post-questionnaire	
Oct, 2007	C	• Delivered by school Principal (Member of the BRAKE curriculum development team) • Duration: 2 full days	41	All Year 11 and 12. (Includes 17 ESL students	Pre-, post-, and 3 month post-questionnaire Focus Group- administered Research Assistant	

		• Classes cancelled to accommodate program				
Term3, 2007.	D	• Delivered by volunteer teacher • Duration:8 weeks, 1 hour per week • Component of school 'Personal Development Program'. Students volunteered to participate.	23		Pre-, post-, and 3 month post-questionnaire. Focus Group. 27/11/07 All data collection administered by BRAKE team member	Focus on awareness of distraction as a hazard.
No program	E (Control group – non intervention	No program	52	All Year 11 BSHS non program participants	Pre and post questionnaire Focus Group- administered Research Assistant	

Appendix Three: Focus group description of participants: variables

Context	Gender	Age range-t2	Learner's permit	Voluntary/ Compulsory program participation	Weekly/intensive	Participants
A	7 participants; 4 females, 3 males	15.8-15.9	2	Compulsory	Weekly	Focus groups comprised all available students who had participated in the intervention program.
C	8 participants; 4 males and 4 females	16.0-16.5	7	Compulsory	Intensive	Selected by the school Principal. Three heterogeneous groups were conducted consisting of 2 groups of 3 and 1 group of 2 participants. All participants were from year 11 and non-ESL students.

Control	9 participants; 4 females, 5 males	16.0-17	7	N/A	N/A	Participants identified by the research assistant on the basis of their gender and providing a representative sampling of low, medium and high risk attitudes as identified in questionnaire responses. Principal organized heterogeneous groups (4 females and 5 males) with a spectrum of identified risk taking attitudes according to student availability.

Appendix Four: Conversational Analysis Sample – focus group dialogue, initial formative phase school intervention (November 2006)

Conversation analysis focuses on the organisation of talk and how participants co-construct social reality in their interactions. Central to this approach is the assumption that meaning and social context are mutually constructed by participants through talk-in-interaction.

In the following extract is from the transcript of an interview between a researcher and two students from the school. The students were shown photographs of potential situations as prompts. Transcript was analysed in terms of turn-taking organisation, sequence organisation, lexical choice and overall structure

1: I: What about this one?

   (3)

2: L: You have to keep (.) ohhh, you have to watch out for um roadwork

3: Interviewer: Mmhm. Why roadwork?

   (2)

4: M: Oh, yeah.

5: Interviewer: Good. Spotted Luke. Yeah.

6: M: Um, keep left (.) and watch for any cars [turning] (.) turning, but maybe they have to give way to you

7: Interviewer: Mmm, yes, but even so.

8: M: yeah. I don't think they could just, like, do a loop.

9: Interviewer: Any other part of this that you need to consider?

   (2)

10: M: Any cars pulling out of this road in front of you.

12: L: You have to watch that car in front of you as well, in case it breaks suddenly.

13: Interviewer: Yup, yup, so are there any rules or anything to do with that?

14: L: well, you've gotta keep (.) 2 seconds behind the car? (looks to M for answer)

15: M: Yup.

16: L: Which it looks like (.) about 2 seconds.

17: M: Maybe more. It's like a car and a half

18: Interviewer: Mmm, mmm.

19: M: and also they look like they're going up a hill, so they just wouldn't want to be going fast 'cause they can't see what's on the other side (.) [cause you could have an accident or something]

20: Interviewer: Yup, Yup, so you need to make sure you're what?

21: L: Slow down before you get near the crest

22: M: Yup, yup and just, like, see what the other car's doing, like, if the other car breaks obviously then you're gonna break, you're not gonna just keep going (.) yeah

   (3)

23: L: The weather's still good

24: Interviewer: The weather's good?

25: M: Yeah!

26: Interviewer: And why is that important Luke?

27: L: If it's raining you're gonna get umm less traction on the road cause the water (speaks too quietly to be recorded clearly here)

   (2)

28: Interviewer: Ok. Got anything else to say?

29: L: Well, it kind of looks kind of bushy on that side, so its more likely that, um, animals are gonna come from that than a suburban place.

Main findings from this extract:

The turn-taking organisation in this extract is one of a question-answer structure, however the interviewer uses the non-committal 'mmm' as a way of prompting the students to continue with minimal intrusion.

The interviewer initiates the sequence with a question and allows time for the students to respond (seconds in brackets). Notably, in line 14, student A directs his question to student B, which is then elaborated on in the line 'Maybe more. It's like a car and a half'. This conversation between the two students (direct address to each other) about road rules and hazards recurs during the interview – these discussions between the students about hazards and rules is indicative of the continuing learning process

Risks associated with the prompts are identified in lines 2, 6, 10, 11, 18, 24 and 26. The 'weather's still good' comment – line 23 – was unprompted by the interviewer and takes place after the other student's comment concerning a separate hazard

Lexical choices – such as 'like' and 'yeah' – more informal language – indicates the answers are not simply memorised, but are re-worded and applied to a new situation – indicative of the students' having learnt the risks.

The context of the interview – at school in a semi-structured interview style with an adult researcher – potentially creates bias in the students' responses, as they are more likely to answer in a way they see as favourable to the person in authority. Several times the students look to the interviewer for clues, but the interviewer does not respond verbally

This bias would be lessened with unstructured 'conversations' in focus group style

Also – the fact that the students show evidence of learnt concepts does not imply that they will apply this when they drive

Potential problems affecting results: poor sound quality of video-recording may have affected transcribed interview, as some utterances may have been inaudible and the interviewer was out of video frame, so gestures, body language could not be included in the analysis
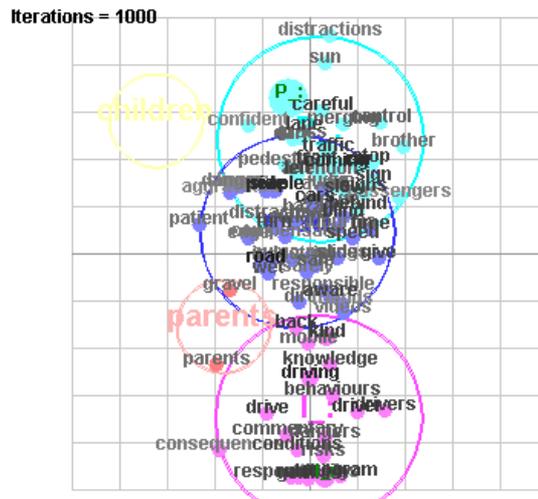
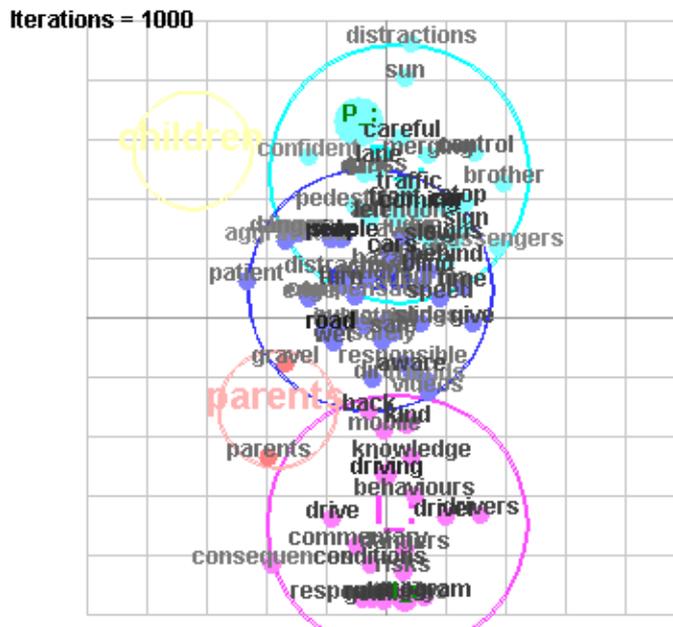**Figure One: Semantic Map, Intervention Focus Group Dialogue (Nov. 2006)**

Figure Two: Semantic Map, Pilot Context C Focus Group Dialogue (Nov. 2007)

Below is a sample interpretation of the map in figure two above:

P is the central term in the upper cluster appearing with a complex range of terms including *careful, lane, traffic, stop, car, sign, people, blind, cars, side, behind, front, coming, slow, left, merge* and *hazard*. The close semantic relationship of these terms provides insights about the complex range of contexts in which these terms have been used by course participants. The spectrum of terms refers to a diverse range of driving considerations including: rules (*sign, merge*), attitudes (*careful*), behaviours (*slow, stop*), and awareness of the surrounding environment (*people, blind, cars, hazard).* When displaying 100% of terms in the analysis, a denser cluster of terms occurs in the upper quadrants. The density of this complex upper cluster further demonstrates the highly integrated and diverse nature of the participants' discussion. This is also supported by the spectrum of co-occurring terms occurring in the cluster: *suburbia, grass, control, attention, hazard, cautions, safe, avoid, distraction, judge, pedestrian, compensate, sun, safely, brother, edge, danger* and *gravel*. This relational cluster of concepts is highly informative as it indicates that participants are critically engaging in the complex process of driving by making complex judgements. Further, the cluster of road safety terms demonstrates meta-cognition, (understanding and control over knowledge application). Importantly, as the dialogue is complex and sustained and characterised by use of driving metalanguage it shows an understanding of driving concepts and relationships, hence participants understanding of driving concepts can be considered deep.

The term *Parents* occurs in close association with *driving*. Perusal of text passages indicates that participants had developed a very clear understanding of their parents' role and responsibilities in teaching them to drive. Analysis indicated participants' gained a new understanding of the pivotal role that parents play in guiding and supervising their driving to maximise their safety as a driver. Further they understood how they can educate their parents in this role. Hence there is evidence of a role reversal where participants became the teachers of their parents and there is shared mutual learning.

Importantly, this association reveals information about the nature of the learning that has occurred and evidence that participants are analysing, synthesising and transferring program knowledge to their lived experiences.
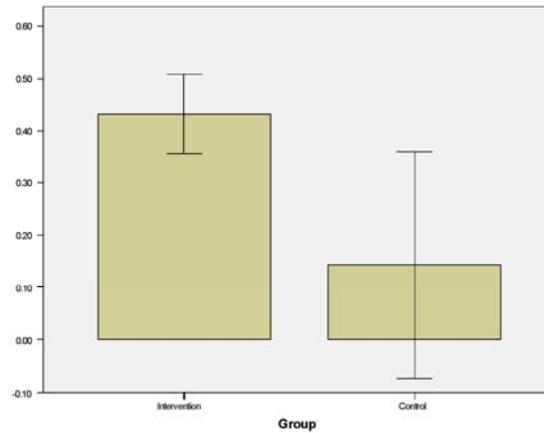

Table Two: Part A (Mean Parent Items Average Scores Intervention & Control Groups)