

## Teacher change: A preliminary exploration of teachers' risk-taking in the context of ICT integration

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This research is a preliminary exploration of teachers' risk-taking habits in educational change, within the context of learning to integrate Information and Communication Technology (ICT) into Australian and United States curriculum. The research defines "risk" as the potential for undesired results, specifically when individuals and groups engage in change. In educational change, such as using a new software package, teachers may be required to modify teaching practices. Some teachers may have concerns related to student learning, perceiving lower student achievement as a risk; others may have used the software in the past with positive results, therefore not perceiving a risk. The research theorizes differences in individual and school culture beliefs and values influence teachers' risk perception. This paper presents an initial application of Cultural Theory classifying teachers' individual risk perceptions, in relation to school culture and ICT integration. Clarifying how teachers perceive risk-taking and technology will help schools understand teachers' needs and perceived barriers within ICT-related change.

This study is a preliminary exploration into teachers' risk-taking habits, as they relate to individual and school cultural risk perceptions in the context of ICT-related educational change. Research has shown perceived risks to be systematic and predictable when examining risk management and related controversies (Slovic, P., 2000). When teachers implement new teaching practices they are taking risks. They leave proven practices and learn to apply new methods, tools, and strategies in the classroom. The research defines "risk" as the potential for undesired results, specifically when individuals and groups engage in change. The project has chosen to study risk-taking in the area of technology integration – how teachers begin to utilize educational technology in the classroom, effectively facilitating information literacy<sup>1</sup> in student learning in Australia and the United States.

Cross-cultural research, such as this, helps control ethnocentrism when considering beliefs and values (Hofstede, 2001), primary components in risk perceptions and habits. Study findings will provide new perspectives into teachers' values and beliefs regarding educational change. Results will help schools support teachers as they learn to innovate in the classroom, thus making teacher training more effective.

### **Culture and risk perception**

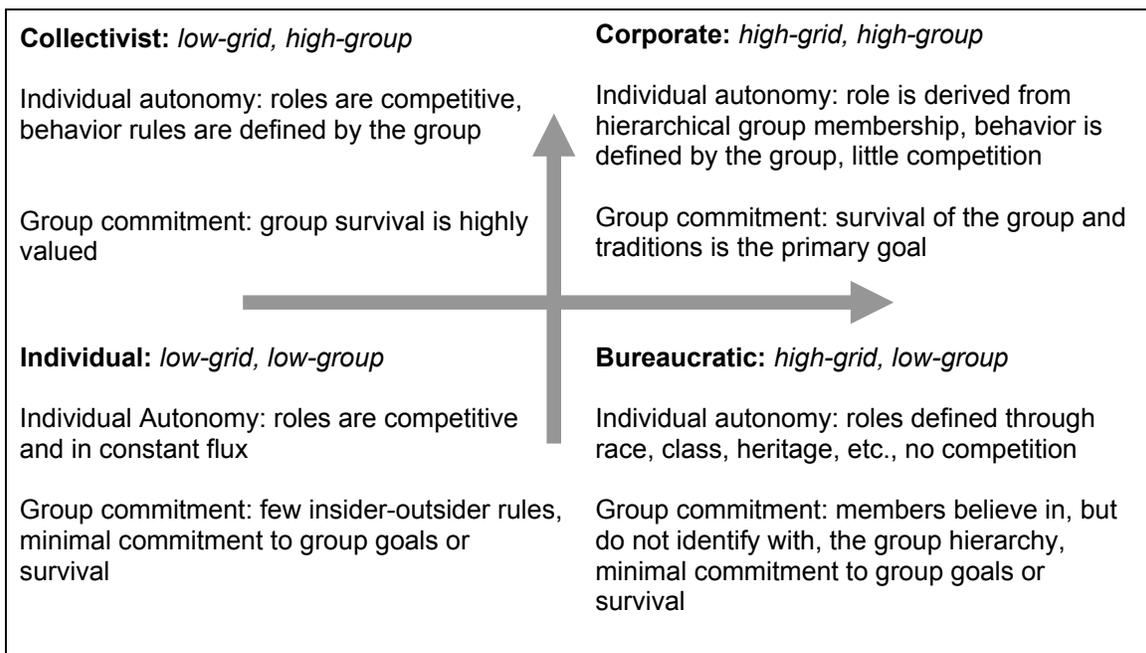
This paper presents a section of a larger PhD dissertation, focusing on a preliminary assessment of teachers' perceived risk in the context of ICT-related

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<sup>1</sup> Information literacy in science, engineering, and technology disciplines is defined as a set of abilities to identify the need for information, procure the information, evaluate the information and subsequently revise the strategy for obtaining the information, to use the information and to use it in an ethical and legal manner, and to engage in lifelong learning (ACRL, 2007).

educational change, through Cultural Theory. “Cultural theory...classifies different types of cultures based upon their levels of individual autonomy” (Douglas, 1992, p. 187). Cultural constraints are classified through grid-group typology, which is used extensively in risk perception and organizational culture research (Lupton, 1999; Sjoberg, Koaroa, Rucai, & Bernstorm, 2000; Spitzer, 1975). “Grid” refers to the extent to which the members of a group adhere to hierarchy and procedural rules, their level of individual autonomy. “Group” refers to the extent members are committed to the social group and isolation from non-members (Douglas, 1992; Harris, 1995).

**Table 1:** Grid-group typology classification



\*derived from (Douglas, 1992; Harris, 1995; Rohrmann & Renn, 2000)

Understanding group structure can give insight into cultural values. Looking at variables in risk theory, knowledge, personality, political orientation, or demographic information, “...cultural theory gives the best predictions of a broad range of perceived risks and an interpretive framework in which these findings cohere” (Wildavsky & Drake, 1990, p. 53). The concept of risk perceptions has been widely applied in sociology, economics, politics, ecology, etc., in an attempt to determine what people consider “risk” (Chauvin, Hermand, & Mullet, 2007; Slovic, P., et al., 2000). Identifying individual or culture’s risk perceptions creates a theoretical structure, helping to define and categorize values and beliefs (e.g. how does a faculty feel about technology). Previous research has explored grid-group application in education, but not in specific contexts of ICT-related educational change (Harris, 1995).

Risk perceptions and values are examined over four basic cultural areas: object of concern, social deviance, nature, and technology, as seen in Table 2. Group risk perceptions are based in ideology and beliefs relating to individual

group members ideology and beliefs, rather than personalities or knowledge (Wildavsky & Drake, 1990). Ideology and beliefs will dictate why a person subscribes to a cultural group; therefore, individual values parallel and perpetuate the group.

**Table 2:** Grid-group typology perceived risks

	<b>Object of concern</b>	<b>Social Deviance</b>	<b>Nature</b>	<b>Technology</b>
<i>Hierarchy (Corporate/Bureaucratic<sup>2</sup>)</i>	<b>Obedience and authority-</b> behavior as a product of group agreement	<b>High Risk-</b> behaviors may disrupt preferred (superior/subordinate) form of social relations	<b>Low Risk-</b> good will come if expert opinions are followed in regard of how to use nature	<b>Low Risk-</b> approve of processes and products as long as experts have given safety certifications
<i>Individual</i>	<b>Risk is opportunity-</b> supporting market relationships, and self-regulation	<b>Relative Risk-</b> threat only when limiting freedom, market relations, and autonomy- prefer to negotiate for themselves	<b>Low Risk-</b> nature should be used for development, any damage will be compensated for by gains in the market	<b>Low Risk-</b> trust that institutions can control or compensate for unwanted events, vehicle for unlimited enterprise
<i>Collectivist</i>	<b>Equality-</b> greater equality of conditions for people and nature	<b>Low Risk-</b> reject prescriptions associated with hierarchy	<b>High Risk-</b> "fragile", limited resources, feel it will be exploited	<b>High Risk-</b> value equality, technology will be used to exploit nature and poor people

\*derived from (Rohrmann & Renn, 2000; Wildavsky & Drake, 1990)

Grid-group typology helps researchers understand groups' values, and what they accept and reject as risks. Kluchhohn (1965, p. 395) states, "A value is a conception, explicit or implicit, distinctive of an individual or characteristic of a group, of the desirable which influence the selection from available modes, means and ends of actions". Therefore, the "object of concern," helps define group risk perceptions and actions through value classification.

Humans are constantly making choices based upon value systems. Values can be assessed through "intensity" and "direction" along a continuum. If an issue has relevance to people (intensity) they will identify outcomes as "good" or "bad" (direction) (Hofstede, 2001). For example, determining a person's attitudes and beliefs regarding ICT can reveal if it is something they value; does the cost justify the benefit. The intensity and direction of the perception, *how* good or bad, implies something may be desired or desirable. Building upon this concept, the operational definition of risk becomes - the perception that loss resulting from actions will have negative results or costs, compromising what people personally, and culturally value.

### **Risk in educational change**

Educational research has identified many factors, including values and beliefs, explaining how teachers engage in change and professional development

<sup>2</sup> Corporate and Bureaucratic types have very similar risk perceptions, as they are both Hierarchical groups.

(Calderhead, 1996; Cohen, 1993; Dall'Alba & Sandberg, 2006; Ertmer, 2005; Fullan, 2001; Gutskey, 1986; Sandholtz, 2006; Scribner, 1999; Smylie, 1988). At this time, educational research has not explored the concept of risk in teacher training and technology integration. All risk perception is relative to context (Oltedal, B., Klempe, & Rundmo, 2004; Slovic, P., 2000). Individuals' specific contexts strongly affect teachers' responses to training, such as personal experiences, current classroom situation, personal ideas about teaching, etc. – part of each teacher's context is their school. Individual risk perceptions often relate to culture and communities (Douglas, 1992; Giddens, 1984; Lee, Dedrick, & Smith, 1991; Nasir & Hand, 2006; Slovic, 2004; Wildavsky & Drake, 1990), therefore school culture will influence how teachers view educational change (Scribner, 1999). Administrative support could help, or hinder teachers change process through facilitating peer interaction to assist in problem solving, including teachers in change related decision-making. These types of interactions can help create community values and beliefs regarding change (Little, Gearhart, Curry, & Kafka, 2003). By exploring what individual teachers, and school cultures, perceive as risks during change, the education community can begin to develop support strategies addressing these issues.

The larger dissertation is concerned with teachers' risk-taking habits on two levels: individual and school culture. Studying risk on a cultural level illuminates broad values and beliefs. On an individual level, it is necessary to understand how culture dictates or influences personal perceptions and judgments. The research will concurrently examine both individual and cultural risk perceptions in relation to ICT and change. This paper focuses specifically on exploring a preliminary classification of school culture, using grid-group typology, in relation to ICT-related change.

### **Data collection**

The research utilizes a mixed-methods design, in two phases. Phase 1 is a descriptive cross-sectional survey questionnaire. Phase 2 is a constant comparison case study in an Australian school and a school in the United States, over one year. In-depth case studies will help construct a comprehensive look at individual teacher risk perceptions within school cultures. In Phase 2<sup>3</sup>, the researcher conducted episodic interviews, observed classrooms, and analyzed school documents to develop a preliminary sense of individual and cultural risk perceptions. The episodic interview method is particularly appropriate for this task, as it considers social groups and technological change (Flick, 2000). This information is necessary to determine perceived risks and cultural values.

This paper examines preliminary school categorization using grid-group typology through the 1<sup>st</sup> Phase 2 interviews at both case study schools.

### **Common ground**

In an effort to control for ICT and teaching experiences, the research will study teachers and schools involved in the Intel Teach Program (ITP). ITP is a

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<sup>3</sup> At the time this paper was presented, data collection was not completed.

standardized professional development program, which has been administered to 3 million teachers worldwide since 2000 (Intel). Schools individually elect to participate in the Intel program. Program participation requires schools to have a minimum level of computers and related technology equipment, typically a computer lab. The program is being implemented in NSW and FL during the 2006-2008 school years. To participate in the program, school principals must agree to give teachers appropriate time to learn from peer mentors. ITP participation does not necessarily imply mentor teachers are actually training peer teachers. Participation in the Intel program implies schools have similar goals, helping teachers to use technology in the classroom. The current research views participation in the Intel program as a starting point for school participation (case studies), but not necessarily a defining element in individual teacher's experiences.

Beyond their professional development commitments, the case study schools are comparable on several levels. They are both located in rural communities and implement state and national-level standardized testing, as seen in Table 4.

**Table 4:** Comparable descriptives of case study schools

	<b>East Middle School, FL</b>	<b>North High School, NSW</b>
Area population	19,055	19,452
School population	481	952
Grades	5-8	7-12
Teacher/ Student ratio	1:14.5	1:11.9
Reading (2006-2007)*	61% (FCAT-NRT)	77.7% (ELLA)
Numeracy (2006-2007)*	54% (FCAT-NRT)	53.2% (SNAP)

One difference between the schools is implementing curriculum standards and frameworks. Teachers in Florida are expected to use the Sunshine State Standards when developing curriculum (FLDOE, 2006). In some areas, standardized curriculum is supplied to schools by the school district. This was not the case at East Middle School. In NSW, schools and teachers are expected to utilize subject area curriculum frameworks, provided by the Board of Studies. Teachers in NSW are expected to teach databases and spreadsheets in Science and Maths respectively (BOS, 2007).

### **“Building” school culture**

A preliminary picture of the two school cultures was constructed using teacher interviews, school policy documents, and key informant interviews. Themes extracted from interview texts, were developed using open coding, and triangulated with school policy documents. Emerging themes are technology, community, and leadership, as they related to culture and teaching. Interview excerpts were aligned with grid-group typology, using Douglas's (1992) criteria:

Grid: Individual autonomy, constrained explicitly defined rules and role expectations (high grid); or unconstrained individual autonomy, due to lack of rules and roles (low grid)

Group: Group commitment, is group survival important (high-group); or unimportant (low-group)

School categorization is based upon individual criteria, not comparison to other schools (Harris, 1995).

### **East Middle School, Panhandle area**

East Middle School is located in the northwest, panhandle, region of Florida, approximately 30 minutes south of Alabama and 45 minutes north of the Gulf of Mexico. Driving to EMS on Interstate 10, only a solid green wall of trees is visible. This is distinctly rural Florida. Taking a few turns off the highway, and traveling through the town's two traffic lights, there is little to see. On a side street, past a small lumber mill, the school becomes visible. Single level buildings connected by covered walkways sprawl along a gradual rise. There is a large white wooden sign in the front of the building with an American flag, the school name, and the school's test ratings for the last 5 years. The school grounds are neat, litter or graffiti is not obvious.

At EMS, teachers have dedicated classrooms. Students rotate between the classrooms for different subjects. Teachers are grouped in grade level teams. The four case study participants teach in grades six through eight (Bands 3 and 4). Their subject areas are Reading, World Cultures, Exceptional Student Education (ESE), and Maths. The following interview excerpts begin to illustrate the teachers' perceptions of grid and group within school culture.

### ***Individual autonomy***

Analysis revealed perceptions of individual autonomy (grid) through narratives of school leadership, community, and teaching. EMS teachers identify a high level of autonomy and trust, within their prescribed roles. They feel confident, if they apply standards and follow policy.

"It's very structured...you know where you stand right up front... As long as you follow their set rules and policies...."

"...they trust the people we have working for us are doing what they are doing..."

"...we have our job teaching and ordering textbooks. I feel like he puts a lot of faith and trust in staff, and lets us take care of our business."

"We have standards we have to do...it is left up to us how we do things in the classroom."

Specifically, in regards to using technology in the classroom:

“...no one tells me to use certain types of media. It’s up to me what I use...But, we have to stick to the Florida state guidelines.”

“...if I were given a set of things [technology] by administration, and told I had to do that, I would try it. But, I feel like if I’m in the classroom I probably know more about my kids than they do...”

“...and, it all being so new [reading software]...I may miss something....I have set goals I need to teach...expectations and state standards, and I make sure those are covered...”

“I’m not a risk taker in the classroom. We have to stick to the Florida state guidelines... It is important to be cautious when integrating...”

Teachers’ comments showed a strong sense of autonomy in the classroom, curriculum, and technology use, as long as state standards and school guidelines were followed.

### ***Group commitment***

The concept of group commitment (group) is expressed through the interview question, “How would you describe the overall school community?” Responses show teachers identifying varying perceptions of group membership. Two, of the four teachers, identified an “insider and outsider” dynamic within the school. In the past two years, the school has gone through significant staff changes; many of the teachers have taught at the school for only 2 years, while the other half has been there for the entirety of their career.

“The first year, actually because of the clique – the “hometown clique” – I did feel a little bit an outsider. People were nice, but I definitely knew I was an outsider. This year is it much more relaxed. We are working together pretty well I think.”

“... I don’t live here, so its hard for me to answer...This being my first year here, at times you miss – you are not involved in anything....”

“I was always welcome. It’s a very supportive atmosphere...we work well together.”

One teacher, who has been at the school for 16 years, makes the following comment regarding the school community:

“... we are a pretty strong, we are really and truly a really strong school.”

Overall, preliminary analysis shows generally positive attitudes towards school culture, even if the teacher felt they were an outsider in the community. All

teachers felt they could go to fellow curriculum teachers for help when necessary.

### **North High School, Central Coast**

North High School (NHS) is located on the NSW Central Coast, approximately 100 km north of Sydney and 75 km south of Newcastle. Driving out of Sydney along the Pacific Highway the landscape rapidly changes from dense population to bush. Leaving the metropolitan area, grey green foliage lines the roadside, and periodically dips away to reveal wide gorges and waterways. Sixty-six percent of the surrounding area is Forestry or Bushland. Leaving the highway and driving into town, towards the ocean, new sprawling housing developments are visible.

The route from the highway to the school goes through several roundabouts, past an RSL, and a small strip-mall. The school is situated a few minutes off the main road, next to a medium-sized shopping center. Trees shade the front of the school complex, which is a multi-leveled mass of buildings and covered walkways. Walking into the school, there is some obvious litter and graffiti, as well as a significant amount of gum on the ground.

Teachers at NHS are grouped in faculties with dedicated staff rooms. Teachers and students rotate classrooms. The four case study participants teach in grades seven through ten (Bands 3 and 4). Their subject areas are English, Science, Special Education (ESE), and Maths. The following interview excerpts begin to illustrate the teachers' perceptions of grid and group within school culture.

### ***Individual autonomy***

Teacher comments show strong perceptions of individual roles, specifically in relation to leadership, in the school culture. General comments stated teachers were involved in the decision-making process, but input was not always considered in the final decision. Teacher comments showed strong perceptions and adherence to hierarchical structures, accepting leadership decisions.

“It is fairly regimented [curriculum]. We have common tests, so we have a list of topics...there is not much flexibility in what we teach and the order we teach. But that is normal.”

“...we sit down and discuss it... they [leadership] always listen to me and say, yeah it's a good idea, go for it, or look you are on the wrong track and this is going to happen because you didn't have experience in this. They say it constructively.”

“It is a 'boys club'...It is not my situation, but a lot of head teachers who are females, whinge that they are not promoted to higher things because it is a boys club.”

“It’s a political game [leadership]...there are teachers who do speak up and make suggestions to leadership, and they accept when they get passed over.”

Specifically, in regards to using technology in the classroom:

“As a faculty we use technology less than others... I think part of it is that there is a lot of work to get through in a limited time.”

“In the syllabus it says create a database...it all depends on the teacher - how they manage that outcome, that technology outcome, to put it in the classroom.”

“There is no explicit teaching. I know in Science they are more computer literate than us, they specifically have syllabus requirements. I think some courses lend themselves to using computers.”

Responses show, teachers’ individual perceptions of autonomy and technology use are closely linked with their faculty.

### ***Group commitment***

All teachers felt the school was a pleasant work environment. General comments such as, “everyone smiles and says ‘hi’” and “I enjoy coming to work” were common. Teacher responses showed varying levels group commitment (group) within individual faculties and school culture. Teacher comments showed a strong sense of the school culture being different from other schools in NSW.

“They were following the department one [policy], but the school did not have one officially... we are following the department, but the culture of the school is different, so we need to have our own policy.”

“We have a different culture than schools in Sydney...It’s a different culture in the school.”

Teachers continued to show strong commitments to their faculties, and a lack of interaction between faculties.

“There is no need to interact with other faculties... if I had a question about a particular student. I would speak to the year advisor, outside of the faculty. Apart from that, there is no need to speak to another faculty.”

Teachers also commented, “No one eats lunch in the common room...everyone eats in their own staff rooms.” Overall, teacher comments showed a positive perception of school culture.

## Hierarchical cultures

The Hierarchy cultural type perceives “behavior as a product of agreement” as an object of concern. A preliminary assessment of EMS and NHS places both cultures within the Hierarchy category, due to concerns regarding outcomes, adhering to standards, and faculty expectations. These perceptions show “high-grid” perceptions in both case studies, but comments vary between high and low affiliations in regards to group commitment.

**High-grid:** It is expected, in a work place setting with an established leadership, members would acknowledge a hierarchy. All teachers spoke to adhering to “standards,” “the syllabus,” and “outcomes.” Teachers at EMS perceived a higher level of individual freedom in teaching. This perception could be directly related to differences between state standards and curriculum frameworks. The difference is particularly evident in regards to technology integration. Science and maths teachers at NHS are required to teach technology, as outlined in their syllabi; although, they are free to teach technology using their own method. EMS teachers do not have clear expectations regarding technology integration. It will be important to explore this difference in future analysis.

Teachers at EMS perceived there was a high level of trust between faculty and the administration. NHS teachers did not raise the concept of trust. Considering teachers’ comments regarding decision-making at NHS (boys club, political game, etc.), it is possible teachers do not feel trusted by, or do not trust, administrators. Typically, expert trust is an important aspect of Hierarchical cultures. Second NHS interviews will seek to reveal if teachers trust administrators, or if they feel trusted. The level of trust relates to groups perceived technology-related risk in the culture, thus could influence how teachers accept ICT-related change.

**High/Low group:** At this time, it is unclear if EMS or NHS can be classified as Bureaucratic or Corporate cultures. Typically, rural communities have strong insider/outsider rules. Insider-outsider perceptions are raised at both schools, thus placing both schools with the Corporate culture. Teachers at EMS showed a varying sense of membership within the culture, depending on how long they had been at the school. NHS teachers all felt strong group membership within faculties, not necessarily the whole school. Therefore, individuals could become “deviants,” a high risk consideration in Hierarchical groups.

A mix between the Bureaucratic and Corporate cultures could be due to staff structures. EMS teachers are grouped in grade level teams, but go to curriculum teachers for help if necessary. Therefore, they are leaving their formal groups for teaching support. Teachers at NHS are grouped in subject area faculties, and are located in staff rooms, thus creating a stronger sense of group membership. This difference could have implications relating to “group agreement” (see Hierarchical Object of Concern, Table 2) when determining teaching behaviors, such as technology integration.

Considering context specific technology integration and use, EMS teachers’ perceptions fall within the Bureaucratic category. Comments suggest teachers value ICT, but need to know how they will use it effectively in the

classroom. Teachers expressed wanting to know the guidelines defining their behavior within ICT integration. Technology integration expectations at NHS are outlined in curriculum frameworks; therefore, teachers have a better sense of appropriate actions and behaviors. A clear sense of, and desire to fulfill, goals implies a Corporate culture.

### **Conclusion**

Classifying school cultures using Cultural Theory and grid-group typology helps identify possible risk perceptions during ICT-related educational change. Understanding cultural concerns can help schools provide appropriate teacher support, facilitating their change process. The two case studies presented have been preliminarily categorized as Hierarchical cultures; Bureaucratic or Corporate has not been determined. This classification implies risk perceptions are strongly related to maintaining individual roles and group rules, minimizing social deviance, and trust. The research posits, teacher training in this culture type should directly address teachers' roles in ICT-related change, how teachers will align new curriculum with school goals, state standards, and curriculum frameworks. In Individual or Collective cultures, this type of structure would not be necessary.

Considering the Bureaucratic culture type, these concerns should be of primary importance, reinforced, and evaluated after training and in the classroom. Teachers should begin to identify new skills or teaching methods as part of their role, if not as a group goal. Lack of group commitment could be a problem in Bureaucratic cultures when implementing change initiatives. If training controls for culture's perceived risks, teachers will feel more confident, taking risks in the classroom and using new ICT-related skills and tools. These assertions will be explored in the second and third interview phases.

This preliminary discussion shows grid-group typology can be used to investigate individual and cultural values within a school. In the remaining data collection, the research will specifically focus on validating teachers' perceived training needs in relation to possible differences between Corporate and Bureaucratic cultures, in the context of ICT-related educational change.

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