Funds of Knowledge: An investigation of coherence within the literature

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ABSTRACT

Two decades ago academics based at the University of Arizona brought the anthropological concept of Funds of Knowledge into the educational realm, providing a new conceptual framework to counter deficit theorizing of Latino students and their families. The growing body of literature evidences the belief and hope of academics in the potential of Funds of Knowledge to advance social justice and facilitate long-awaited breakthroughs in multicultural education practice.

This paper provides an overview and analysis of Funds of Knowledge literature, addressing two key questions: What is the current scope of settings for Funds of Knowledge research? What do writers mean when they talk about Funds of Knowledge? Findings of differences in definitions indicate their contested nature. The review recommends clear articulation by researchers of the definition employed. Key questions arising from studies are presented and implications for multicultural education practice and teacher education are discussed.

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1. Introduction

1.1. Background

Dispiriting research findings have shown the prevalence of deficit theorizing among teachers internationally (Gee, 1996). Deficit theorizing blames the underachievement of ethnic minority groups in schools on perceived deficiencies relating to the minority students themselves, their families and their cultures (Bishop, 2001; Gonzalez, 1995; Irvine & York, 1993; Moll, Amanti, Neff, & Gonzalez, 1992). It explains low student achievement with reference to a plethora of inadequacies, such as inadequate home literacy practices, inadequate English language, inadequate motivation, inadequate parental support and inadequate self-concept. Committed and dedicated teachers may truly believe in, and despair of, their students' perceived constraints; but tragically this deficit theorizing mindset ultimately leads to expectation and acceptance of low academic achievement. Implicit in deficit theorizing is the notion that poor student achievement is unrelated to schooling. A teacher's deficit mindset may be hidden from the holder, due to lack of consciousness of closely held attitudes and beliefs, and understanding of how these may create obstacles to student achievement (Aguilar & Pohan, 1996).

Funds of Knowledge – hereafter referred to as FoK – research follows on from several decades of scholarly work concerned with social justice issues such as the validity and impacts of deficit theorizing. In 1972, Ryan was one of the first scholars to state that deficit theorizing led to "culturally deprived schools" (p. 61). In the 1960s, in the early days of educational anthropology, disparities in ethnic achievement became a concern of the American federal government (Eddy, 1985), leading to a range of ethnographic studies which explored schooling experiences of various minority groups (such as King, 1967; Rosenfield, 1971; Ward, 1971; Wolcott, 1967) Spindler and Spindler's description of Rosenfield's study seems relevant to the work as a group: it "portrays the intense brutality of a system that does not really seem to "see" children" (1983, p. 75). However high quality case studies achieved a disappointing readership, leading Spindler and Spindler, to conclude "we talk mostly to ourselves" (1983, p. 74).

Other seminal work in the 1960s by the American anthropologist Oscar Lewis describes "the culture of poverty" (1966) found in marginalized poor communities in capitalist societies where employment prospects are bleak, and the dominant cultural values of wealth and status through personal merit are experienced as unattainable. He describes the lives of individuals, and dynamics of and between families, showing the rationality of individuals' behaviors and attitudes under these conditions. Lewis and FoK scholars present different findings regarding bonds within poor communities. Lewis describes the struggle for survival within slum communities as being played out on an individual level, such as siblings competing for scarce resources. In contrast, Velez-Ibanez

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(1988) finds that Latin households form strong social networks for the purpose of sharing information and resources.

The work of Shirley Brice Heath (1983) resonates closely with FoK scholars, and is cited by twelve studies reviewed here. Her detailed ethnographic study describes different literacy practices in three communities, highlighting the challenge posed for Trackton students by the unfamiliarity of school questioning techniques. When teachers developed more culturally relevant practice by drawing on home questioning styles, Trackton students' success markedly improved. This work can be seen to illuminate differences in students' pedagogical FoK, awareness of which – like other FoK – can usefully inform teacher practice.

Today, despite such rich objective data from educational anthropologists (also notably including Foley, 1996; Spindler & Spindler, 1997; Wax, 1967), and a well-developed body of multi-cultural education literature describing and explaining the validity of culturally relevant teaching practice (Banks, 2004; Delpit, 1995; Gay, 2010; Grant & Sleeter, 2007; Ladson-Billings, 1994; Nieto, 2002; Sleeter & Grant, 2007), the popularity of deficit theorizing persists (Shields, Bishop, & Mazawi, 2005), providing worrying evidence of the deeply entrenched nature of teachers' attitudes and practice.

The FoK concept (Moll et al., 1992; Moll & Greenberg, 1990; Moll et al., 1990a, 1990b) not only presents a further rebuttal of the prevalent deficit theorizing model, but also seeks to involve teachers in conducting and applying research, to link theory and practice. As Patterson and Baldwin (2001) report, FoK research "brought us face to face with our ignorance, and our arrogance" (p. 127). The richness of children's lifeworld experience tends to exceed that of their school experience (Andrews & Yee, 2006). These findings highlight the importance of teachers learning about their students, and the possibilities of teachers working as researchers.

A huge surge in global migration in recent decades is marked by greater numbers of individuals moving from more countries to more destinations (Castles & Miller, 2003). Worldwide, approximately 200 million individuals live somewhere other than their birthplace (Vertovec, 2009). Consequently in many international settings, including the USA, Britain, Australia, and New Zealand, the population is becoming increasingly ethnically diverse (see Hugo, 2000; Ministry of Education, 2002; Ortman & Guarneri, 2009; Vertovec, 2007 respectively). Since teachers as a group remain relatively homogenous (Jones & Sandridge, 1997), this causes a widening ethnic gap between teachers – dominated by middle class white females – and students. Teachers can work effectively with students from cultures other than their own (Hawk, Cowley, Hill, & Sutherland, 2002), when they are able to relate to them, and support their identity and learning as cultural beings (Bishop, Berryman, Tiakiwai, & Richardson, 2003; Hawk et al., 2002). It is crucial that teachers appreciate that they themselves are also cultural beings, as indeed are all individuals (Delpit, 1995). This is the pre-requisite for gaining self-awareness of unconsciously held cultural perspectives, values, and practices (King, 2004). Children from both working class and middle class backgrounds have access to language-rich environments (Heath, 1983). However, teachers tend to recognize and draw on knowledge and experiences of white middle class children much more frequently. Therefore many *disadvantaged* students, from ethnic minority families with lower socio-economic status, are actually more correctly *disadvantaged by* a fundamental lack of alignment between their own FoK and those of the teacher (Irvine, 2003; Rosebery, McIntyre, & Gonzalez, 2001; Velez-Ibanez & Greenberg, 1992). A range of recent studies confirm that this is not a neutral situation, since the teacher's and student's FoK may be in direct conflict with one another (Rosebery et al., 2001). Potential consequences may include learning and/or relationship problems between teacher and student, due to underlying

differences or misunderstandings of "our ways of being in the world" (Gee, 1996, p. viii). Success for ethnic minority students is at the cost of their cultural identity (Fordham & Ogbu, 1986).

To support the learning of ethnically diverse students successfully, teachers clearly need to build their knowledge of students. How can this be done? Traditional teacher professional development (TPD) conveys generalized information about cultures but fails to address diversity and dynamism within cultural groups (Gonzalez, 1995). In our shrinking world, characterized more and more by "translocal, transnational, and transborder communities" (Gonzalez, Andrade, Civil, & Moll, 2001, p. 116), fast-paced change results in new and mixed practices in many spheres of life. "Students increasingly draw from an intercultural and hybrid knowledge base, appropriating multiple cultural systems, as youth culture permeates greater and greater spheres" (Gonzalez, 2005, p. 37). Irvine (2003) presents herself as an example of this intercultural hybridity: she grew up as "a non-Catholic who attended an all-Black …. Catholic school in Alabama that was administrated by White priests and nuns from the Mid-West" (p. 8). Thus sociocultural influences, and other diverse aspects of identity, are different for every student, making each individual unique (Grant & Sleeter, 2007), indeed multicultural (Erickson, 2007), deflating the validity of both content and process of traditional forms of TPD for multi-cultural education.

FoK offers a new conceptual framework for informing effective practice for diverse students. It is centered on the principle that the best way to learn about lives and backgrounds is through a focus on households' everyday practices, by learning about "what people do and what they say about what they do" (Gonzalez, 2005, p. 40). The potential of this approach lies in its ability to identify what is, rather than what is not; and to engage with individuals, rather than assumptions and stereotypes. It thus brings a post-modern perspective (Gonzalez, 1995) to multicultural education. With accurate knowledge of students, teachers can draw on student experiences and priorities in schooling, thus validating student knowledge and life values, and enabling them to scaffold student learning from the familiar. In this way, by starting with the familiar, long-term possibilities are widened (Gonzalez, 2005).

1.2. Origins of the term 'Funds of Knowledge'

The roots of the term 'Funds of Knowledge' are anthropological; the term was originally coined by Wolf (1966) to define resources and knowledge that households manipulate to make ends meet in the household economy. These include caloric funds, funds for rent, replacement funds, ceremonial funds, and social funds (Wolf, 1966). Velez-Ibanez's (1988) ethnographic study of economically vulnerable Mexican communities in Mexico and USA drew on Wolf's definition. Diverse and abundant FoK found within the communities included:

…information and formulas containing the mathematics, architecture, chemistry, physics, biology, and engineering for the construction and repair of homes, the repair of most mechanical devices including autos, appliances and machines as well as methods for planting and gardening, butchering, cooking, hunting, and of 'making things' in general. Other parts of such funds included information regarding access to institutional assistance, school programs, legal help, transportation routes, occupational opportunities, and for the most economical places to purchase needed services and goods. For the most part, clustered households are very self-sufficient and do not depend greatly on the market for technical assistance. (Velez-Ibanez, 1988, p. 38)

Velez-Ibanez (1988) also found that FoK were socially distributed and exchanged, by means of strategic development and maintenance of thick exchange networks between households. He notes that within all cultures, mechanisms to support survival are developed, and these practices and conventions can be expected to vary in different groups.

Velez-Ibanez's (1988) study was inspirational for a group of anthropology and education academics based in Tucson, Arizona, USA, at the University of Arizona, who recognized the relevance of the concept and findings to school settings. These academics include educationalists and anthropologists, who have collaborated in various combinations in a number of research projects. The group includes Luis Moll, Norma Gonzalez, James Greenberg, and Carlos Velez-Ibanez himself. School and kindergarten teachers, and doctoral students, have also had key roles in these studies, including Martha Civil, Rosi Andrade, Joel Dworin, Martha Floyd-Tenery, Kathy Whitmore, Cathy Amanti, Douglas Fry, Elizabeth Saavedra, and Javier Tapia. The work of this group has been foundational and inspirational. They have led the research drive in this field, producing or editing all but one book chapter examined in this review, as well as the government reports, and eleven of the journal articles. Throughout the review I refer to them collectively as the Tucson academics.

2. Method and limitations

2.1. Method

This review was informed by both systematic and narrative approaches to reviewing literature (Gough & Elbourne, 2002; Oakley, 2003; Slavin, 1986, 2002). Like Hobson, Ashby, Malderez and Tomlinson (2009), I find it arbitrary to seek to categorize the review as either systemic or narrative, instead finding most helpful an organic review process of beginning with defined objectives and guiding questions, while maintaining openness to issues becoming apparent while reading.

For the purposes of the literature review, I identified academic work on FoK using the writers' own description of the work, by use of the term 'Funds of Knowledge' in the text abstract. Also for reasons of manageability for this monolingual reviewer, I limited the works reviewed to those available in English.

I have limited the review of Funds of Knowledge literature to focus on an area that relates to my personal research interest, arising from my background as a secondary teacher who taught in multicultural schools in New Zealand and the Cook Islands. The literature review is confined to studies related to school settings, excluding work reporting on FoK research in other educational settings such as early childhood and tertiary settings, and special education. Also excluded are studies related to FoK in other fields beyond education, such as medicine.

As well as manual searches thorough the Victoria University of Wellington library catalogue, my search for literature utilized a range of electronic databases available to me, including Scopus, Educational Resources Information Centre (ERIC), A+ Education, Proquest, Index New Zealand, and World Cat. Originally I sought to identify and draw on peer-reviewed journal articles or books, which provided methodology details as well as reporting on research findings related to FoK in school settings, so that rigorous critique could be applied. However, due to a relatively small number of papers which met these criteria, and identification of a significant number of theory or position papers on the topic, I decided to widen my criteria for analysis. Other texts included are papers that reported on research findings, even if the methodology information was very brief, as well as those which conceptualized the topic. I believe this is justifiable given that this area of research

is still relatively new, resulting in a significant amount of position papers seeking to explore the potential of the concept. I originally located and analyzed 46 articles, 28 book chapters, and two government reports. I employed a grid template to collect data from the texts, including research method, identification of conceptual basis, and definition of the term. This process facilitated the systematic comparative analysis of texts. Ultimately this review draws on my reading of 50 texts in the field, including 37 journal articles, 11 book chapters and two government reports. Excluded texts related to school settings; however, they either did not meet my criteria for selection, or related to aspects of FoK research beyond the scope of this review.

This review presents a description and analysis of the literature. At the close of relevant sections, summaries of key findings and points for discussion are shown in tables to provide a clear overview for the reader.

2.2. Limitations

A limitation arises from the exclusion of work which may be conceptually aligned to the principles of FoK, without use of that terminology. In part this constraint was necessary to achieve manageability, given the timeframe available for the project and the need to identify the scope definitively, for the review to be coherent and focused. Although I am hopeful that my search mechanisms yielded a significant proportion of relevant academic work, certainly this review does not claim to be comprehensive, especially due to its exclusion of texts available only in languages other than English.

3. Findings and discussion: what is the current scope of research settings?

3.1. Geographic scope

Only twelve texts examined for this review originated outside USA, including six from Australia, five from the United Kingdom, and one from Canada, indicating that the vast majority of FoK theorizing and research has been by Northern American scholars. Of these, FoK research is concentrated in just eleven states, with texts by academics in Arizona (13), Illinois (6), New York (3), Michigan (2), Texas (2), Minnesota (2), Kentucky (2), Massachusetts, North Carolina, Wisconsin and California (1 each). This distribution of U.S. research studies is shown in Fig. 1.

□ Originating states for American Funds of Knowledge research

Fig. 1. Geographic settings for Funds of Knowledge research in schools.

3.2. Educational settings

Texts examined reported on research in a range of settings, including households (4), households and classrooms (9), and schools/classrooms (15). Texts reporting on research in school settings related to bilingual classrooms (5), elementary schools (19), middle schools (6), and high schools (2).

3.3. Educational context

Early studies addressed the application of FoK to literacy development, particularly for bilingual students. However, subsequent research has related to a range of curriculum areas, including literacy and language arts (7), history and social studies (1), mathematics (3), and science (8).

Nine texts explored wider school issues and possibilities aligned to FoK, including qualities of effective teachers (Irizarry, 2009); bilingual classroom assistants (Martin-Jones & Saxena, 2003); teacher professional development (Olmedo, 1997, 2004); implications for assessment practice (Klenowski, 2009; Lee, 1998); factors affecting teachers' and schools' willingness to access and draw on students' FoK (Thomson & Hall, 2008; Zipin, 2009); and lessons from FoK regarding curriculum and relationships in effective schools to provide "critical care" for students (Antrop-Gonzalez & De Jesus, 2006).

Gonzalez et al. (2001) discuss the challenges of helping family members to identify their mathematical FoK within everyday household activities, because of prevalent Mathematics discourse, which has privileged elite Western male contributions (McBride, 1989, cited in Gonzalez et al., 2001). This issue may have influenced the uneven scope of research in curriculum areas.

4. Findings and discussion: what do writers mean when they talk about Funds of Knowledge?

4.1. Contestation of the term 'Funds of Knowledge'

Differences in the way the FoK concept is understood and applied indicate that, in effect, the term is contested. There are four main areas of disagreement: FoK as sources of knowledge or areas of knowledge; what knowledge is incorporated in FoK; whose knowledge is incorporated in FoK; and, arising naturally from the other variations, identification of the conceptual basis of the work.

4.2. Foundational definitions by the Tucson academics

Work of the Tucson academics maintains conceptual congruence with its sources. For instance, Greenberg summarizes Velez-Ibanez's (1988) description of FoK as "an operations manual of essential information and strategies households need to maintain their wellbeing" (1989, p. 2); this definition is foundational for two early studies (Moll & Greenberg, 1990; Moll et. al., 1990a). Moll et al. (1990a) further clarify the function of FoK: to enable the household "to survive, to get ahead, or to thrive" (p. 2). The Tucson academics have continued to cite Wolf's (1966) definition in ongoing work as recently as 2001.

According to this view, FoK relate to strategically important life knowledge and skills within the context of the community, and are connected fundamentally to practice (Gonzalez & Moll, 2002). FoK are socially distributed throughout the community, and exchanged by families with strong bonds of trust and shared expectations of reciprocity (Moll & Greenberg, 1990). Thick and rich exchange networks in Latino communities allow FoK to be adapted and updated constantly.

Moll et al. (1992, p. 134) define FoK as "historically accumulated and culturally developed bodies of knowledge and skills essential for household or individual functioning and wellbeing". This definition highlights the relevance of FoK for individual as well as household functioning, to enhance quality of life.

4.3. Influence of Tucson academics

The Tucson academics have had substantial influence on the work of others in the field. Of the 50 texts analyzed for this review, 35 cited the work of a Tucson academic to define FoK. This included 19 texts which quoted and cited a definition from the work of a Tucson scholar; 10 texts which reference Tucson academic work and use the writers' own words to describe the concept; and six texts which cite Tucson academics when referring to FoK, but provide no defining statement. Analysis of the latter two groups' studies revealed differences in conceptualization of the term.

Three congruent definitions of FoK by Tucson academics have proved to be foundational. Table 1 shows the three definitions, with a list of studies which have employed the particular definition. Studies are listed chronologically to show employment of the definitions over time. The table also records definitions with individual nuances in meaning.

4.4. Differences in definition: sources of knowledge or areas of knowledge

Two divergent views are apparent in the literature regarding the *source* of FoK. Firstly, some writers use an alternative definition of FoK, conceptualizing it as *sources* of knowledge available to students and households, apart from formal educational sources. Thus, Moje et al. (2004) describe four source categories: family, community, popular culture, and peer group (knowledge from fellow students to assist navigation of school life). Students' FoK within each of these categories are identified, such as knowledge of economic consequences of scientific activity, from family FoK; thus the term is used simultaneously to mean *sources* and *areas* of knowledge (Fitts, 2009; Moje et al., 2004). This approach diverges from the more commonly applied view of FoK simply as *areas* of knowledge, in line with Wolf's (1966) original concept. It raises two questions. Are FoK categories seen more appropriately as *areas* of knowledge, or *sources* of knowledge? Is it valid to treat them as both? Most studies reviewed treat categories as areas of knowledge. I suggest that dual use of the term is potentially confusing, although it is employed by Moje et al. (2004) to promote debate about *what sources* of FoK are valid or authentic.

The question of appropriate scope of the FoK definition is the second issue related to *sources*. Moll et al. (1990b) discuss observations of students reading about music and writing music, and the application of this theme to promote engagement in the classroom. However their definition focuses on household FoK, and does not reflect or acknowledge FoK which arise from popular culture. Moll's later work (2005) acknowledges that a *household* study does not provide comprehensive information about students' FoK, which is also developed by means of their independent activities in other settings.

Some writers argue for a wider definition, based on findings about lifeworld sources of students' knowledge. Andrews and Yee (2006) argue that FoK accruing to students from other interests and influences in their lives is authentic, avoiding what they view as arbitrary exclusion of certain types of lifeworld knowledge and skills. Moje et al. (2004) report findings of FoK of 12–15 year-old Latino students from low income, working class families in Detroit, Michigan, USA. They found that students' FoK come from "homes, peer groups and other systems and networks of relationships" (p. 38);

Table 1
Influence of definitions by Tucson academics.

Foundational definitions of Funds of Knowledge	Research examples which cite this definition, in chronological order	Nuances
"Households must manipulate (several funds) for subsistence and development… Each of these … entails a broader set of activities which require specific knowledge of strategic importance to households. These bodies of knowledge are what we call Funds of Knowledge" (Moll & Greenberg, 1990, pp. 322–323).	Lee, 2001; Bouillion & Gomez, 2001; Moje et al., 2004; Nelson, 2001; Upadhyay, 2005; Dworin, 2006; Andrews & Yee, 2006; Hughes & Greenhough, 2006; Hughes & Pollard, 2006; Fitts, 2009	"cultural Funds of Knowledge" (Lee, 2001, p. 99) "resources of knowledge around them that they use in their daily lives" (Nelson, 2001, p. 3) "different Funds of Knowledge (Moll, Velez-Ibanez & Greenberg, 1989) such as homes, peer groups and other systems and networks of relationships that shape the oral and written text young people make meaning of and produce as they move from classroom to classroom and from home to peer group, to school, or to community" (Moje et al., 2004, p. 38) "Knowledge and skills gained through historical and cultural interactions that are essential for individuals to function appropriately in his/her community … including knowledge about any activities or interactions that take place in homes" (Upadhyay, 2005, p. 96) "knowledge, skills or learning which resides or takes place in minority ethnic communities within multi-ethnic populations in countries such as the US" (Andrews & Yee, 2006, p. 436) "funds of linguistic and cultural knowledge" (Fitts, 2009, p. 88)
"historically accumulated and culturally developed bodies of knowledge and skills essential for household or individual functioning and wellbeing" (Moll et al., 1992, p. 134)	Gonzalez et al., 1995; Olmedo, 1997; Gonzalez et al., 2001; Martin-Jones & Saxena, 2003; Olmedo, 2004; Varelas & Pappas, 2006; Civil & Bernier, 2006; Dworin, 2006; Hughes & Greenhough, 2006; Hughes & Pollard, 2006; Rowsell, 2006; Hattam & Prosser, 2008; Thomson & Hall, 2008; Smythe & Toohey, 2009; Hattam et. al., 2009; Zipin, 2009	"A kind of cultural capital" (Olmedo, 1997, p. 47) "everyday knowledge" (Olmedo, 2004, p. 248) "everyday experiences, events, activities, observations, accounts and recollections … shaped by and shaping the children's own private worlds and home lives … life experiences in general … represent an important dimension of the resources children bring with them to classrooms" (Varelas & Pappas, 2006, p. 221) "extended the term 'Funds of Knowledge' so that it applied to teachers as well as to parents and families" (Hughes & Pollard, 2006, p.389) "the cultural resources and competencies that we bring to other settings eg home stories built into children's writing and drawings" (Rowsell, 2006, p. 147) "knowledges embedded in the labour, domestic, family and community practices of border-crossing Mexican American families" (Thomson & Hall, 2008, p. 88)
"Funds of knowledge is based on a simple premise … that people are competent and have knowledge, and their life experiences have given them that knowledge " (Gonzalez & Moll, 2002, p. 625)	Basu & Barton, 2007; Barton & Tan, 2009; Upadhyay, 2009	"historical and cultural knowledge" (p. 468). May be particular to a family eg knowledge about care of elderly, also disposition, values. Affected by personal context, life experience, which affects individual's disposition/values as well as knowledge and skills (Basu & Barton, 2007, p. 468) "diverse FoK that are grounded in students' membership and experiences in out-of-school worlds that they inhabit" (Barton & Tan, 2009, p. 52)

furthermore, popular culture FoK were as significant as those gained experientially (p. 64). Their definition explicitly includes sources of knowledge tapped by students, applied not only in *household* operation, but in settings which affect *individual* wellbeing, including at school and socially, also followed by Barton and Tan (2009).

Other scholars in the field argue that additional valid FoK arise from students' talents and interests (Barton & Tan, 2009), or any resources, observations or experiences beyond school (Nelson, 2001; Varelas & Pappas, 2006). There is significant support for identification of students' FoK from popular culture and incorporation of these into classroom learning experiences.

Andrews and Yee (2006) also point out the dynamic nature of personal interests and popular culture FoK. This notion is aligned with earlier characterization of FoK as heavily contextualized. A range of studies in diverse fields, including literacy, cultural geography and youth cultures provide evidence of the diversity of FoK in different contexts (Thomson & Hall, 2008, p. 88). For instance FoK may include environmental knowledge, such as desert gardening (Khan & Civil, 2001). Andrews and Yee's (2006) argument is that students' FoK are dynamic, due to the dynamic nature of the students and their families. Despite this distinction, both explanations of FoK as dynamic and highly contextualized underscore the essentially personalized quality of FoK, and the inappropriateness of generalizing findings.

Varelas and Pappas (2006) examined the usefulness of reading informational texts aloud to allow elementary students to draw on their FoK in dialogue in response to text, and progress their scientific understandings. Students' comments made in discussion arising from teacher reading of informational texts were categorized. Some categories did not delineate between prior knowledge from school and non-school settings, thus representing a different conceptualization of FoK. This differs from more popular views of FoK as brought *to* formal schooling by students (and their families), having been *developed outside formal schooling*, "for household or individual functioning and wellbeing" (Moll et al., 1992, p. 134).

Table 2 summarizes alternative views of sources of FoK, and research examples which have employed each approach.

What are valid sources of FoK? Are they limited to home and community, or should knowledge from other relationships and experience, such as schooling, peers and popular culture, be considered valid? Moll et al. (1992) grounded their definition of FoK in the characteristics of importance and authenticity for survival and wellbeing, to allow greater in-school connections to FoK for the advancement of students' and families' goals and priorities. Moll et al. (1990b) emphasise that the term "refers not only to the categories and content of knowledge found in households, but to how this knowledge is grounded, embedded, in the "thick" social and cultural relations that make up family life" (p. 1).

Table 2
Sources of Funds of Knowledge, with research examples of each (in chronological order).

Within and between households		
Velez-Ibanez, 1988; Moll & Greenberg, 1990; Moll et al., 1990a; Moll et al., 1990b; Moll, 1992; Moll et al., 1992; Velez-Ibanez & Greenberg, 1992; Gonzalez et al., 1995	Olmedo, 1997; Lee, 1998; Gonzalez et al., 2001; Rosebery et al., 2001; Bouillion & Gomez, 2001; Patterson & Baldwin, 2001; Gonzalez & Moll, 2002; Martin-Jones & Saxena, 2003	Gonzalez et al., 2005; Gonzalez, 2005; Hughes & Pollard, 2006; Andrews & Yee, 2006; Basu & Barton, 2007; Thomson & Hall, 2008; Hattam & Prosser, 2008; Zipin, 2009
"Family, community, peers and popular culture"		
Moje et al., 2004	Barton & Tan, 2009	
Student and family interests		
Upadhyay, 2005; Andrews & Yee, 2006	Hattam & Prosser, 2008; Barton & Tan, 2009	
Popular culture		
Nelson, 2001; Moje et al., 2004	Thomson & Hall, 2008; Hattam & Prosser, 2008	Irizarry, 2009; Barton & Tan, 2009
Community		
Bouillion & Gomez, 2001; Hammond, 2001; Nelson, 2001; Gonzalez & Moll, 2002	Olmedo, 2004; Basu & Barton, 2007; Thomson & Hall, 2008; Hattam & Prosser, 2008	Zipin, 2009; Irizarry, 2009
Culture		
Lee, 2001	Upadhyay, 2005	Antrop-Gonzalez & De Jesus, 2006
Life experience		
Upadhyay, 2005; Varelas & Pappas, 2006	Basu & Barton, 2007; Smythe & Toohey, 2009	Barton & Tan, 2009

What other valid purposes could FoK have, apart from relevance to household and personal wellbeing? What relevance do alternative sources have to economic wellbeing or other personal goals? In broader conceptualizations the purpose of FoK is not so closely tied to economic wellbeing. Undeniably, popular culture, peers, and other systems and networks are part of "everyday lived experiences" of students (Gonzalez, 2005, p. 39), underpinning competence and knowledge (Gonzalez & Moll, 2002). Given opportunities to do so, students design learning experiences to enable access to their FoK, and progress personal goals; these opportunities for choice are valued (Basu & Barton, 2007). Arguably, popular culture and other FoK also influence students' personal goals and priorities, such as their preferred communication strategies, career goals, and even identity development. These goals and priorities differ from those of economically marginalized Latino families in whose communities FoK were first observed and recorded (Velez-Ibanez, 1988), but given the increasing prevalence of transnational lifestyles, greater "interculturality and hybridity of cultural practices" (Gonzalez, 2005, p. 37), and the high penetration of advanced communication technologies into the mass market, can we construct a valid argument for excluding these sources of FoK from a valid definition?

Varelas and Pappas' (2006) methodology implies a treatment of FoK which includes prior knowledge from school and lifeworld. This begs the question of the conceptual validity of aligning FoK with lifeworld experiences alone.

Contestation of validity of potential FoK may also be subject to competing value systems (Smythe & Toohey, 2009). For instance, the hip hop concept of "representin'" (to show pride, serve as delegate), which has taken on the status of a cultural code for many urban youth, may be seen as a Fund of Knowledge (Irizarry, 2009).

4.5. Differences in definition: what knowledge?

Two main areas of debate are raised for discussion by Lew Zipin (2009) relating to the question of what knowledge is appropriately considered within FoK.

Firstly, Zipin (2009) notes the absence of any referral to students' "dark" pedagogies (p. 320), for instance, knowledge about bullying, mental health problems, alcoholism, discrimination, or other challenging issues. He asks "can only 'positives' in students' lifeworlds constitute positive learning assets?" (p. 322). Although learning experiences to address students' dark FoK explicitly are potentially empowering and transformative for students, they can also engender feelings of discomfort, which may trouble teachers too (Zipin, 2009). In settings which feature outcomes-based education models (Sanga, Hall, Chu, & Crowl, 2005), school administrators are reluctant to draw on dark student knowledge (Thomson & Hall, 2008). Thus the transformative potential of tapping dark FoK may be difficult to realize.

Despite these challenges, to identify and draw on dark FoK is potentially highly useful for students. Such discussion can generate high student participation, support relevant connections with other knowledge, and allow conversation about their concerns and questions (Grant & Sleeter, 2007). I would argue that any approach which ignores or excludes specific FoK held by students imposes negative value judgements on students' cultural capital. Arguably this is the very practice which FoK hopes to reduce, so that pedagogy and content contextualizations which are familiar, relevant, and meaningful to students from ethnic minority groups are not excluded.

Secondly, Zipin (2009) draws attention to the notion and relevance of household pedagogy: strategies and contexts by which FoK are learned by children within household or community settings. This aspect of FoK is described by Moll and Greenberg (1990) and Velez-Ibanez and Greenberg (1992), but is noticeably absent from other work. Case studies of Mexican households found that children in these families learn at home by watching, questioning and taking on tasks, thus actively directing their own learning (Moll & Greenberg, 1990). Parents were patient, encouraging, and tolerant of error; they gave children space and time to work through projects independently (Velez-Ibanez & Greenberg, 1992). Therefore at home these children learned within a "zone of comfort" (Velez-Ibanez & Greenberg, 1992, p. 17), which supported growing resilience, confidence, and willingness and ability to problem-solve.

Household pedagogy warrants the consideration of FoK academics, because different conversational patterns, teaching and

learning approaches, and other pedagogical features are also potential sites for incongruence between teacher and student. In the Hawaiian Kamehameha Early Education Project, teachers found that when they reduced their use of directed questioning, and insistence on turn-taking, students increased their use of the familiar overlapping conversational style of 'talk-storying.' The changed classroom pedagogical practice led to improvements in participation levels and reading comprehension (Au, 1980). Fitts (2009) notes that it is important for older students as well to incorporate pedagogies which counter-balance "Anglo-centric perspectives and practices" (p. 102). She reports greater inclusivity for Latin students when the teacher switched from the Initiation–Response–Evaluation discussion format, unfamiliar to students from Mexican schools. Khan and Civil (2001) describe a teacher's practice which replicates some children's household pedagogy. The teacher's curriculum unit development was guided primarily by the students' admiration of Navajo weaving, and their desire to learn how to make vegetable-based dyes to create similar works. The unit of work evolved organically, always relating to authentic contexts, guided by student interest and community FoK. Findings highlight high student motivation and participation in the unit, which facilitated both literacy development and mathematical concept learning.

Findings that pedagogical practice is a potential source of incongruency for students from ethnic minority groups support Zipin's (2009) argument for use of pedagogy FoK in schools. This is potentially a powerful way to achieve cultural congruence for disenfranchised students, because dispositions operate at a subconscious level, embedded in individuals as "habitus" (dispositions arising from response to background, experiences, and conditions encountered) (Bourdieu, 1977). For this very reason perhaps, bringing pedagogy FoK into classrooms may be particularly difficult for teachers (Zipin, 2009).

4.6. Differences in definition: whose knowledge?

A further point of disagreement between academics in the field relates to the issue of *whose* knowledge should properly be considered when defining FoK.

Some variations on the definition and application have significantly different conceptualizations. For instance Bouillion and Gomez (2001) defined FoK as "distributed expertise" (p. 894), specifically resources of parents and other adults in the community, but this conceptualization does not explicitly acknowledge or value FoK of *students themselves*. This work builds on a key principle of the FoK concept, the "simple premise … that people are competent and have knowledge, and their life experiences have given them that knowledge" (Gonzalez & Moll, 2002, p. 625), but does not extend this view to students. This conceptualization thus diverges significantly from Moll and Greenberg's (1990) view. A range of studies acknowledges and utilizes students' expertise in different areas, as detailed in Table 3.

British academics involved in the Home School Knowledge Exchange Project "extended the term 'Funds of Knowledge' so that it applied to teachers as well as to parents and families" (Hughes & Pollard, 2006, p.389). This approach transformed the concept to a term meaning *prior knowledge and skills themselves*. Ironically, due to its reciprocity, this definition loses the inherent power-balancing capacity and intent of an approach centered on FoK of students and their families. This was evident in the finding of some attempts by teachers to "colonise" home practices, which resulted in parental resistance (Hughes & Greenhough, 2006, p. 484). Also weakened is the strong focus on the teacher as learner (Moll et al., 1992).

Table 3 summarizes different views of whose knowledge the FoK concept relates to, listing research examples of each.

Once again divergent views raise questions for researchers in the field. In the application of the concept to educational contexts,

Table 3
Differences in Funds of Knowledge definition: Whose knowledge?

Views of whose knowledge is encompassed by the Funds of Knowledge concept, with research examples of each (in chronological order)			Comments
Household members			
Moll & Greenberg, 1990; Moll et al., 1990a; Moll et al., 1990b; Moll, 1992; Moll et al., 1992; Velez-Ibanez & Greenberg, 1992	Gonzalez et al., 1995; Gonzalez, 1995; Gonzalez et al, 2001; Rosebery et al., 2001; Nelson, 2001; Khan & Civil, 2001; Patterson & Baldwin, 2001	Gonzalez & Moll, 2002; Moje et al., 2004; Gonzalez et al., 2005; Dworin, 2006; Andrews & Yee, 2006; Hattam & Prosser, 2008	
Household members, and teachers			
Hughes & Pollard, 2006	Hughes & Greenhough, 2006	Civil & Bernier, 2006	Teachers' professional Funds of Knowledge
Household members, and teachers			
Khan & Civil, 2001	Ayers et al., 2001		Teachers' lifeworld knowledge and professional knowledge other than teaching
Students			
Moje et al., 2004	Basu & Barton, 2007	Hattam & Prosser, 2008	
Moll, 1992	Dworin, 2006		Bilingualism
Maher et al., 2001	Klenowski, 2009		Cultural knowledge
Conant et al., 2001			Musical expertise
Rowsell, 2006	Smythe & Toohey, 2009		Personal literacy practices
Lee, 2001			Language vernacular: African-American signifying
Upadhyay, 2009			Spirituality
Thomson & Hall, 2008	Zipin, 2009		'Dark' knowledge
Gonzalez & Moll, 2002; Martin-Jones & Saxena, 2003; Upadhyay, 2005	Andrews & Yee, 2006; Rowsell, 2006; Varelas & Pappas, 2006	Thomson & Hall, 2008; Zipin, 2009; Upadhyay, 2009	Personal life experiences and home practices
Parents and other adults in the community			
Olmedo, 1997; Bouillion & Gomez, 2001	Hammond, 2001	Civil & Bernier, 2006	

Table 4
Issues arising from Funds of Knowledge research.

Review themes	Critical issues	Questions raised
Research scope	Geographic spread	What validity does the Funds of Knowledge concept have in diverse international settings?
		What are the key elements of Funds of Knowledge which allow meaningful transfer across international borders?
		Why is Funds of Knowledge research concentrated in specific areas?
		What is the impact on findings of teacher beliefs regarding curriculum flexibility?
		In educational models which are not outcomes-based, how do findings on teacher practice differ?
	Educational settings	Why is Funds of Knowledge research concentrated in elementary school settings?
		What are the key factors for successful research and application of Funds of Knowledge in high school settings?
		Is Funds of Knowledge relevant to teachers across diverse curriculum areas?
	Participants	What are the advantages and disadvantages of conducting Funds of Knowledge research primarily in communities with low socio-economic status?
		What participant selection will generate research findings for classrooms with ethnically diverse students?
Definition	Areas of knowledge or sources of knowledge	Is it appropriate to conceptualize Funds of Knowledge as areas or sources of knowledge?
		What issues arise from describing Funds of Knowledge as both areas and sources of knowledge?
		What consideration needs to be given to potential sources and areas of Funds of Knowledge in planning research methodology?
	Source validity	What are valid sources of Funds of Knowledge?
		What other valid purposes could Funds of Knowledge have, apart from relevance to household economic wellbeing? What relevance do alternative sources have to economic wellbeing or other personal goals?
		What is the line between prior knowledge and Funds of Knowledge?
		Is it relevant to seek to identify Funds of Knowledge specifically from students' lifeworlds?
		Is it valid to consider knowledge gained from school experiences as part of Funds of Knowledge?
	Area validity	How significant are pedagogy Funds of Knowledge?
		What are the advantages and disadvantages of seeking to identify students' dark areas of knowledge?
		How can schooling tap students' dark knowledge safely and usefully?
		What are the implications for research methodology?
	Whose knowledge	In the application of Funds of Knowledge to educational contexts, what is the validity or significance of Funds of Knowledge of students? teachers?
		How should the appropriate scope for holders of Funds of Knowledge be determined?
		How can the theoretical framework inform this issue?

what is the validity or significance of FoK to students? Teachers? How should the appropriate scope for holders of FoK be determined? How can the theoretical framework inform this issue?

5. Conclusion and recommendations

5.1. Research

Arguably, findings of differences in researchers' definitions of FoK work relate to application of the concept in a variety of contexts. Just as a hybrid view of culture leads to the expectation of diverse findings, in my opinion it is unhelpful to force agreement on a single definition, which may be inappropriate for specific settings and purposes.

Key questions arising from analysis of studies have been presented in the Findings and discussion section for each review theme, and are summarized in Table 4. The tabular summary aims to provide a basis for reflection on diverse conceptualizations of the term, to inform planning of future research. For future studies, I encourage researchers to fully articulate the definition which underpin their work. This practice will enable each study to be located clearly within the body of work, and support coherent and clear development of new knowledge in the field.

Future conceptualizations may align closely with the underlying philosophy of original FoK studies to recognize the knowledge of marginalized students and their families, as a way to redress ill-informed negative judgements perpetuated by deficit theorizing. Other goals may include improving the relevance and authenticity of schooling, for example by investigating immigration knowledge and experiences within the local community, to seek multiple voices and perspectives that could be missing from textbooks. Alternatively FoK work might seek to support community empowerment and transformation. Therefore the extent of conceptualizations of the term thus far does not limit any future possibilities.

5.2. Teacher practice

FoK research has important implications for teacher practice. These findings challenge teachers to reconsider their conceptualization of knowing their students, to illuminate new opportunities for authentic culturally responsive pedagogy (Nieto, 2007). The FoK concept also challenges teachers to direct their gaze at students' lives, looking beyond assessment data to identify prior knowledge. It encourages teachers to have wide visions of the sources, scope and depth of students' FoK, and consider how they may develop awareness of this resource. It reinforces the importance of teachers understanding that all individuals are culturally located, and developing greater cultural congruence in their practice.

Diverse definitions suggest the importance of consideration of various FoK conceptualizations by teachers wishing to apply the concept. Notions of FoK each highlight and/or exclude different factors, thus creating learning opportunities for teachers which take different forms, creating different opportunities and limitations. When we consider the prevalence of cultural hybridity (Gonzalez, 2005) alongside the dangers of failing to identify students' FoK, it becomes evident that, to be useful, FoK conceptualizations need sufficiency and validity. Therefore teachers, like researchers, would benefit from close consideration of the definition of FoK which they will apply.

There is wide agreement that students' FoK can be utilized to enhance the schooling experience of ethnic minority children, by scaffolding their acquisition of new knowledge, and supporting their apprenticeship into academic CoPs. The following four examples from research, which feature a range of conceptualizations of FoK, illustrate this point. Cathy Amanti, an elementary school teacher, describes how seeing her student selling Mexican candy gave her the idea to collaborate with her students to design an engaging cross-curricular unit on candy (Moll et. al., 1992). Carol Lee (2001) drew on her African-American high school students' skills and knowledge of signifying, a form of language play used by

speakers of African-American English Vernacular. Signifying gave the students expertise in strategies for interpreting language features, which Lee helped them to apply to academic study of literary works. Irma Olmedo (1997) trains teachers to set oral history tasks for their social studies and history students to conduct with family or community members. This strategy helps students make connections between history and their own lives, validates local knowledge and perspectives, and allows students to be apprenticed into the role of historians. Moll (1992) describes the work of a teacher who, over the course of a semester, invited about 20 "parents and others in the community to contribute intellectually to the development of lessons… developing a social network to access FoK for academic purposes" (p. 23). In this model the teacher facilitates social relationships to engage students in academic tasks, and provides meaningful, authentic learning experiences which are relevant to the students' lives.

Therefore student FoK can usefully inform both *what* is taught and *how*. The first may be achieved by means of inclusive practice in terms of the contexts drawn on for teaching content and skills. The second involves supporting different ways of being in the classroom, including different social interaction styles; by setting tasks which put academic knowledge and skills to use for lifeworld goals, such as designing a statistics project to improve one's sports performance; and encouraging discussion of learning in home languages. Without conscious engagement of students' FoK in the classroom, these can act as invisible obstructions to learning (Moje et al., 2004), and students from minority groups remain in danger of experiencing school as unfamiliar, uncomfortable, and alienating (Dimitriadis & Kamberelis, 2006).

5.3. Teacher education

Conceptualizations of FoK and associated implementation skills and strategies are also relevant to post-modern teacher education programs. FoK offers a conceptual framework for a key message for trainee teachers: first and foremost, know the learner. This message is compelling for teacher education programs with social justice aims, to support future teachers to work effectively in schools with increasing levels of student cultural diversity. As Villegas and Lucas (2002) argue, ITE curriculum needs to develop student teachers' sociocultural consciousness, as a key foundation to support "teachers to cross the cultural boundaries that separate them from their students" (p. xiv). This is particularly important and challenging due to the relative homogeneity of the teaching profession and the success that student teachers have typically experienced in their personal education, which is often accompanied by unawareness of the role of their privileged social position in their personal achievements (Sleeter, 2008).

Villegas and Lucas (2002) state that coherent ITE programs for the development of culturally responsive teachers must incorporate not only relevant content, but also modelling of culturally responsive pedagogy, selection of training strategies to improve student teachers' disposition and skills for culturally responsive practice, and aligned institutional policies and procedures. Without such coherence, ITE risks the credibility of the program content, the price of which would be reinforcement of the current theory-practice divide between training and classroom practice.

Key content for ITE programs includes the tenets of a constructivist approach to teaching and learning, with attention to both cognitive and sociocultural elements (Villegas & Lucas, 2002). This framework situates the learner at the centre of teacher planning, and stresses the fundamental need for the teacher to build on what students already know − their prior knowledge, a crucial part of which is their FoK − begging the question of the nature of students' FoK, and how an accurate understanding of these may be achieved.

Within a constructivist teacher training model, developing knowledge of diverse definitions of FoK in the literature can potentially build student teachers' ideas regarding what students may know and sources of these knowledges. Taking a constructivist approach with student teachers relating to issues arising from this review of the literature will assist connection of the FoK concept to their own experience. What FoK did they have at various ages? From what sources? How do various definitions and examples of FoK offered by researchers in the field relate to their own knowledge and skills? What FoK were held by others within their household and wider community? What difference did it make for them whether or not teachers drew on their personal FoK within the learning process?

Careful selection of possible training strategies and experiences is needed in ITE, to build the awareness of relatively privileged student teachers regarding the resources which arise from students' life experiences, which may be very different from their own. Training strategies which may develop trainees' disposition, knowledge and skills for this task include teaching experiences, autobiographical activities, film-viewing, interactive performance and case method.

A range of studies suggest that teaching experiences (TEs) in ethnically diverse school communities can potentially help dominant culture trainees transcend monocultural life experience (Hogg, 2008). Gillette (1996) found that when trainees develop relationships with students on TE, stereotyped notions or deficit thinking are unsettled, allowing the emergence of teaching practice tailored to the students' needs and identity. Thus coursework tasks can provide a helpful structure for trainees to learn about students during TE. Service learning can also provide a context in which trainees can develop relationships with students and experience attitude shifts when those relationships are sustained, incorporate reciprocal learning, and engage in reflective discussion (Conner, 2010). These findings emphasise the importance of trainees appreciating that effective teachers are lifelong learners (Darling-Hammond, 2006). When earlier coursework builds cultural knowledge, ethnographic skills (Darling-Hammond, 2002) and guided reflection skills (Sleeter, 2008), this reduces the risk of resistance to evidence and continuing reliance on previous beliefs.

Autobiographical reflective activities can potentially support self-awareness of cultural identity, a necessary foundation for appreciating other cultural perspectives (Delpit, 1995). It can also facilitate analysis of one's own FoK, their sources, and potential consequences of educators either drawing on or ignoring their FoK in formal learning. Sharing this work will support trainees to gain multiple perspectives, and begin consider utilizing FoK to develop culturally responsive practice.

Film-viewing can usefully offer a window into the experience of others. For instance, Slumdog Millionaire (Boyle, 2008) and Salam Rugby (Beheshti, 2010) provide examples of FoK, both challenging stereotyped expectations. Slumdog Millionaire is the moving story of a chai wallah[1] who overcomes deficit theorizing and wins 10,000,000 rupees on a television quiz show. Salam Rugby documents experiences of women's rugby teams in Iran. The film Babies (Balmes, 2010) presents portraits of the first year of four babies in four countries, illuminating different sociocultural environments within which children grow up, raising questions regarding what we can learn from this about their various FoK and how we may support school-based learning of children from diverse settings.

Other training strategies that may be used in coursework such as interactive performance (Romano, 2007) and case method (Lynn, 1999) can potentially build on trainees' appreciation for the

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[1] Tea boy.

different perspectives of culturally diverse students, usefully supporting the establishment of substantial personal connections with school students. In interactive performance trainees take on the character of a student and explore their thoughts, feelings and behaviour within a specific situation. Drama devices including thought tracking and hot seating encourage deep thinking and articulation of the character's perspective (Burton & O'Toole, 2005), allowing possible exploration of links between student FoK, teacher practice and student behaviour. Similarly case method can facilitate collaborative reflection on multicultural teaching cases (Andrews, 1997).

Exposure to good classroom practice within teacher education coursework would also support trainees' readiness and willingness to visualize and seek knowledge regarding students' FoK, for incorporation into lessons. Some possible formats are: readings describing classroom practice; viewing video footage of lessons and discussion of teacher decision-making; or discussion with teachers who use a FoK approach. Modelling by teacher educators is also potentially powerful (Loughran, 2006), demonstrating application of FoK to formal learning, and affirming its value with the ultimate compliment.

In summary, this review contributes the presentation and analysis of the range of conceptualizations of FoK described by scholars. The reviewed literature represents a rich resource for consideration for further research, and for developments in teacher education and classroom practice. This review, by highlighting coherence and incoherence of research in the field, illuminates the considerable diverse resources of ethnic minority students and their communities, and offers compelling arguments for a FoK approach to bring theory into practice for the achievement of culturally responsive pedagogy.

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