National contexts influencing principals' time use and allocation: economic development, societal culture, and educational system

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This study examines the impact of macro-context factors on the behavior of school principals. More specifically, the article illuminates how a nation's level of economic development, societal culture, and educational system influence the amount of time principals devote to their job role and shape their allocation of time to instructional leadership, administration, and management of relationships with parents and community. The study employed a 2-level hierarchical linear model (HLM) to analyze data on 5,927 principals in 34 societies drawn from the Progress in International Reading Literacy Study (PIRLS) 2006. The results support the proposition that principal time use and allocation varies substantially across societies and that these patterns of behavior are influenced by economic, sociocultural and institutional features of their societies. The study contributes to a growing body of research that seeks to understand how the practice of school leadership is shaped by the organizational and cultural context.

Keywords: national contexts; school principals; time use; time allocation; leadership

Introduction

The allocation of principal time and attention to different domains of responsibility has been the focus of conceptual analysis and empirical investigation for over 40 years (e.g., Bridges, 1967; Cuban, 1988; Glenn, 1975; Hemphill, Richards, & Peterson, 1965; March, 1978; Peterson, 1977–1978). This body of research supports the proposition that the allocation of greater attention by principals to certain task domains may offer greater leverage for school improvement than others (Bell, Bolam, & Cubillo, 2003; Hallinger & Heck, 1996; Leithwood, Louis, Anderson, & Wahlstrom, 2004; May & Supovitz, 2011; Witziers, Bosker, & Krüger, 2003). For example, a meta-analysis of leadership effects studies recently found that principals who focused on instructional leadership produced a stronger impact on student achievement than principals who emphasized other leadership practices (Robinson, Lloyd, & Rowe, 2008).

At the same time, scholars have also noted that the exercise of school leadership is situated in both an organizational (Bossert, Dwyer, Rowan, & Lee, 1982) and cultural (Dimmock & Walker, 2005; Hallinger, 1995) context. Successful principals

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are not only initiators of action but also responsive to the contexts in which they work (Barth, 1980, 1986; Bossert et al., 1982; Bridges, 1970, 1977; Goldring, Huff, May, & Camburn, 2008; Hallinger & Murphy, 1986; Lee, Hallinger, & Walker, in press-a; Lee, Hallinger, & Walker, in press-b; Lee, Walker, & Chui, in press; Leithwood et al., 2004; Marshall, 1996; Ogawa & Bossert, 1995; Silins & Mulford, 2010). Or as Bridges (1970) asserted, administrators can be viewed as both ''origin and pawn'' in organizational decision-making. These observations suggest that goal and task prioritization, as well as time allocation, represent fundamental challenges facing all school principals (Barth, 1980; Dwyer, Lee, Rowan, & Bossert, 1983; Goldring et al., 2008; March, 1978; Marshall, 1996; Silins & Mulford, 2010).

Researchers have employed a variety of methodologies to document how principals respond to these challenges. These include observed work activity analysis (e.g., Kmetz & Willower, 1982; W.J. Martin & Willower, 1981; Peterson, 1977–1978), structured observation and reflective interviews (Buttram, Mead, Loftus, & Wilson, 2006; Dwyer et al., 1983; Horng, Klasik, & Loeb, 2009; Martinko & Gardner, 1990; Quong & Walker, 2007), surveys (Eberts & Stone, 1988; Silins & Mulford, 2010), ethnography (Wolcott, 1973), and self-report activity logs (e.g., Goldring et al., 2008; May, Huff, & Goldring, this issue; Spillane, Camburn, & Pareja, 2007). Empirical studies have begun to elaborate how principals respond to the needs, constraints, and opportunities in different *organizational* contexts (Day et al., 2010; Dwyer et al., 1983; Goldring et al., 2008; Hallinger, Bickman, & Davis, 1996; Hallinger & Murphy, 1986; Heck, 1993; Heck & Hallinger, 2009; May et al., this issue; May & Supovitz, 2011; Opdenakker & Van Damme, 2007; Southworth, 2002). Yet, as noted by Hallinger and Heck (1996), the study of how broader *macrolevel contexts* (e.g., societal culture) impact principal behavior represents a blind spot in the research literature in educational leadership and management (Bajunid, 1996; Cheng, 1995; Dimmock & Walker, 2005; Hallinger, 1995; Hallinger & Leithwood, 1998; Hallinger, Walker, & Bajunid, 2005).

In this article[1], we explore the impact of three specific macrolevel contexts on principal time use and allocation: (1) national economic development, (2) societal culture, and (3) structure of the educational system. In order to accomplish this broad goal, we address two specific research questions:

(1) How does principals' time use and allocation vary across different national contexts?
(2) How do ''macrolevel dimensions'' of the national context influence principals' time allocation for major realms of responsibility?

The article contributes to the literature in two distinctive ways. First, previous research in this domain has tended to study principals within a single country, often with relatively small samples (e.g., Dwyer et al., 1983; Peterson, 1977–1978). Research examining principals' time use and allocation[2] on an international scale is simply not to be found in the published literature. Drawing upon a large international database, in this study we employ a wide angle lens to examine how principals allocate and use their time across a range of societies.

Second, as the era of globalization gathered pace during the 1990s, scholars increasingly asserted the importance of exploring how school leadership is situated in different national contexts (e.g., Bajunid, 1996; Cheng, 1995, Dimmock & Walker, 2005; Hallinger, 1995; Hallinger et al., 2005; Hallinger & Leithwood, 1998). Nonetheless, empirical comparative research that responds to this call remains

nascent. Thus, we suggest that the current study represents an exploratory foray into a domain that will become increasingly important in the future.

National contexts: economic development, societal culture, and educational systems

We structure this brief review of the literature on national context effects in terms of three types of "macrocontexts" that potentially influence how principals think about and use their time. These are a nation's level of economic development, its societal culture, and the structure of its education system. We selected these macrocontexts because there was conceptual support for their impact on leadership at the school level and pertinent data were available in the dataset.

Economic development

There are several important conceptual purposes in focusing on the level of a nation's economy. The field of comparative education has long regarded national economic development status (or economic level of country) as a predictor of school effectiveness. For example, Heyneman and Loxley's (1983) classic research found stronger school effects than family effects on educational achievement in developing countries. This finding ran counter to findings from developed countries such as the United States in which family effects outweighed the impact of school effects (e.g., Coleman et al., 1966). Scholars hypothesized that the differential impact in developing countries could be due to greater between-school variation in school quality when compared with more economically developed nations. While producing contrasting findings, the economic level of country was also used as a key dimension in a study conducted by Baker and colleagues (Baker, Goesling, & Letendre, 2002). Walberg's (1991) review identified substantial differences between developed and developing countries in approaches to school improvement. For example, economic efficiency was emphasized in educational investment for school improvement in developing countries.

In line with these studies, we wish to suggest the possibility that the status of a nation's economic development could impact how principals conceive of their role and structure their work activities. For example, schools in developing countries often suffer from a lack of both financial and human resources (Hallinger & Lee, 2011; M. Lee, 2006; Sargent & Hannum, 2009). Successful principals must respond to this organizational condition in prioritizing their work focus and activities (Hallinger & Kantamara, 2001). For example, Arikewuyo (2007) reports that Nigerian secondary school principals are keenly aware of the importance of national economic situations that influence school resources and capacity. According to his survey with 200 teachers, a majority of Nigerian secondary school teachers indicated that their principals demonstrated a good understanding of national economy situations that influence their schools (72%) and consider such economic factors in school planning and operation (85.5%). Reflecting the previous research, in this study of macrocontext effects, we included a variable representing national economic status (i.e., gross domestic product [GDP] per capita based on Purchasing Power Parities [PPPs]).

Societal culture

A pioneering conceptual paper by Getzels, Lipham, and Campbell (1968) argued that the broader societal culture exerts an influence on leaders. Following this initial

conceptual work, scholars in the field of management studies have conducted extensive cross-cultural empirical research (e.g., Bigoness & Blakely, 1991; Black & Porter, 1991; Hofstede, 1997, 2001; Hoppe, 1993; House, Hanges, Javidan, Dorfman, & Gupta, 2004; Ralston, Holt, Terpstra, & Cheng, 2007). Although we have noted evidence of growing interest in this feature of school leadership over the past 15 years, similar empirical research remains scarce (Bajunid, 1996; Cheng, 1995; Dimmock & Walker, 2005; Hallinger & Leithwood, 1998; Hallinger et al., 2005; Heck, 1996; Walker, Bridges, & Chan, 1996).

Indeed, despite the absence of scholarly investigations, we suggest that this relationship is particularly salient for understanding leadership in educational organizations. School leaders are centrally concerned with the interpretation and enactment of cultural values embedded in the society (Cuban, 1988; Hallinger et al., 2005; Wolcott, 1973). Thus, we propose that societal culture has a fundamental impact on managerial behavior and that the nature of this impact will vary widely across different societies.

In pursuit of measuring variation in principal behavior across countries, Hofstede's (1997, 2001) conceptual and empirical work provided theoretical and analytical leverage for this study. Hofstede's research on cross-cultural management focused on several key dimensions of national culture that described features of social relationships in organizational settings. Among his measures, we focus solely on the power distance index (PDI). Power distance is defined as "[t]he extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally" (Hofstede, 2001, p. 98). Hofstede describes a society with a high PDI as possessing the following societal norms: Leaders consider subordinates as being of a different status, and vice versa; power holders are entitled to privilege; there exist latent conflicts between leaders and subordinates (see Hofstede, 2001, pp. 97–98).

For example, Hallinger and Kantamara (2001) described the importance of status relationships between school principals and teachers in Thailand, a high PDI nation. They noted that status and age trump other features (e.g., expertise) in social relationships among Thais in the workplace through a cultural norm termed *greng jai*. Roughly translated as *deference*, this describes a behavioral norm whereby Thai subordinates will avoid expressing their opinion until their superordinate has given his/hers. Then, if the subordinate's opinion differs, it simply will not be expressed at all. This form of high PDI pervades all aspects of the Thai organizational and social hierarchy, indeed it is what gives meaning to the hierarchy itself (Holmes & Tangtongtavy, 1996). We used the PDI variable to capture one feature by which societal culture could play a role in shaping principals' time use across different societies.

Standardization of educational system

Recent sociological studies have focused on *institutional* features of national educational systems as a predictor of school effects on educational outcomes (e.g., Buchmann & Dalton, 2002; Buchmann & Park, 2008). These studies have explored the effects of social stratification formed by different institutional arrangements on the behavior of participants in the educational system. More specifically, the literature indicates different levels of standardization associated with institutional features of schooling such as curriculum differentiation, teacher training systems,

national examinations, nationally mandated textbooks, and national curriculum. For example, a more highly standardized education system might employ a national curriculum including mandated textbooks and a national exam. These provide a clear structure for the process of education as well as an accountability structure for the assessment of goal achievement and outcomes. In contrast, a less structured institutional system might include more diffuse expectations and standards, and leave greater room for local initiative.

While, to date, these studies have not focused explicitly on principals, we suggest the possibility that these structural features of national education systems could impact how principals conceive of their role and structure their work activities. The likelihood that these institutional arrangements impact principal behavior was proposed 30 years ago by Bossert and his colleagues (1982). In their seminal conceptualization of principal instructional leadership, institutional structure represented one of the two key context variables incorporated into their model of principal instructional leadership.

Studies that have examined the impact of institutional policies on school leadership provide empirical support for this proposition. For example, in the USA, scholars observe that passage of the *No Child Left Behind Act* (NCLB) changed the structural expectations for principal leadership embedded in the educational system (Schoen & Fusarelli, 2008). More specifically, the requirement for schools to meet national targets on educational examinations on an annual basis created a new set of expectations for how principals *should* spend their time.

Nettles and Herrington (2007) assert that principals must spend more time attending to the education of high-risk students than was the case in the past. They go so far as to claim that policy adoption of NCLB at the national level is changing the American paradigm of principal instructional leadership from one that emphasized indirect paths of influence (e.g., Hallinger & Heck, 1996; Leithwood et al., 2004) to one that emphasizes the principal's direct interaction with high-risk students. This illustrates our proposition that variations in institutional arrangements of a nation's approach to education can impact principal time allocation across societies.

Methodology

This study employs hierarchical linear modeling (HLM) in order to investigate cross-national variation in principal allocation of time to different domains of responsibility. The research centers on analysis of the Progress in International Reading Literacy Study (PIRLS) 2006, a large secondary dataset collected from schools internationally. The application of HLM to the study of macrocontext effects on principals allows us to decompose variance in principal time use and allocation into within- and between-societies portions. Use of this large-scale dataset offers an opportunity to obtain a broad picture of how principals apply their time throughout the world.

Data

PIRLS 2006 administered by the International Association for the Evaluation of Educational Achievement (IEA) encompasses countries from all major geographic regions of the world, including both developed and developing countries. There were

47 participants from the 39 countries in PIRLS 2006. Some countries provided more than one participating sub-unit (e.g., province or region). Nationally representative samples of students in each country were selected using a two-stage sampling design. At the first stage, each country selected at least 150 schools using probability-proportional-to-size sampling (M.O. Martin, Mullis, & Kennedy, 2007). At the second stage, one or two classes in each school were randomly selected for sampling of students. Thus, PIRLS secured a large sample size from among both students and principals from all participating countries. On average, there were 4,864 students from 169 elementary schools participating in each country.

This study includes 34 societies from 28 countries.[3] We excluded several countries from this study due to inaccessibility of data regarding one or more key variables (e.g., power distance, principal time allocation, school size, location, etc.). To reconstruct the dataset for this study, relevant data files (i.e., school questionnaires completed by principals)[4] from 34 societies were merged. Therefore, the final dataset included 5,927 principals from 34 societies.

Measures

The study included two broad categories of independent variables: school-level characteristics and national-level characteristics. The dependent variable(s) focused on principal time use in their job roles. We define these below.

School-level characteristics (Level 1)

School-level characteristics were comprised of variables that describe both compositional characteristics of the school as well as features of the school as an organizational context for education. All the Level 1 variables were used as control variables.

- *School SES*: To indicate the overall socioeconomic status of each school, we used the proportion of students participating in free or reduced-price lunch programs reported by principals.
- *Immigrant student proportion*: We employed the percentage of immigrant students enrolled in the sample schools.
- *Lack of school resources*: PIRLS created an index of school resources based on principals' reports of the extent to which their schools' capacity to provide instruction were impacted by a lack of resources. High values (on a 3-point scale) indicate that the lack of school resources is a serious problem. This index is based on the following 14 items (Cronbach's alpha across countries of 0.85)[5]: qualified teaching staff, teachers with a specialization in reading, second-language teachers, instructional materials, supplies, school buildings and grounds, heating/cooling and lighting systems, instructional space, special equipment for physically disabled students, computers for instructional purposes, computer software for instructional purposes, computer support staff, library books, and audio-visual resources.
- *Negative school climate*: This index indicates principals' perceptions of the following six items: teachers' job satisfaction, teachers' expectations for student achievement, parental support for student achievement, students' regard for school property, students' desire to do well in school, and students'

regard for each others' welfare (Cronbach's alpha across countries of 0.79.). High values (i.e., on a 3-point scale) indicate that school climate is seriously negative.

- *Lack of school safety*: This index based on principals' reports of seven items (alpha across countries of 0.87) indicates the degree to which each of the following was a problem: classroom disturbances, cheating, profanity, vandalism, theft, intimidation or verbal abuse of other students, and physical conflicts among students. High values (on a 3-point scale) indicate that school safety is a serious problem.
- *Home-school involvement*: The index of home-school involvement is based on a combination of (1) principals' responses to questions regarding how often principals hold parent–teacher conferences and communicate with parents regarding students' progress and (2) parents' responses to questions regarding how often parents attend meetings organized by the school. High values (on a 3-point scale) indicate a high level of home-school involvement.[6]
- *School size*: School size is based on the total enrolment of students in the school. This variable was converted into the natural logarithm form since it was highly, positively skewed.
- *School location*: Using dummy codes, we grouped locales into three categories: urban, suburban, and rural (urban = ref. group).

National-level characteristics (Level 2)

We employed three national-level characteristics as Level 2 predictors. Since there were significant correlations between some of the predictors (see correlation matrix in Appendix 1), we checked the variance inflation factor (VIF) and the tolerance parameter of the predictors. We regressed each predictor on all other predictors and found that multicollinearity was not an issue.

- *GDP per capita based PPPs*: We note that previous studies have tended to use one or a combination of GDP per capita, GDP per capita based on Purchasing Power Parities (PPPs), or GINI as indices measuring the economic level of country (e.g., Chudgar & Luschei, 2009; Park, 2005). In this study, we did not include the GINI index for three reasons. First, preliminary analysis indicated that GDP per capita (PPPs) was a better predictor than GINI. Second, there was a need to make our final model parsimonious. Finally, indices providing data on GDP per capita (PPPs) offered the best combination of years in which data were sought and the number of countries from which it could be obtained. In brief, we used GDP per capita (PPPs) which was drawn from the International Monetary Fund (IMF).[7] The values were converted into the natural logarithm.
- *PDI*: The index was originally developed from Hofstede's (1997, 2001) study of a multinational corporation (i.e., IBM) focusing on cross-national cultural differences by gathering data from the same target groups from IBM companies located in different countries. As such, it initially encompassed 72,215 respondents from 40 countries and later included 10 countries and three regions representing another 14 countries (Hofstede, 2001). High PDI (on a 1–104 scale) indicates a high level of hierarchical power relations.
- *Standardization of educational system*: PIRLS 2006 provided information about whether participant countries have a national curriculum, nationally

recommended or mandated textbooks, and national exams at the elementary school level. Because some countries like Morocco did not provide information about national education systems and curriculum policies, several sources were also utilized to supplement relevant information (e.g., World Education Encyclopedia). Societies were categorized into four groups based on the level of standardization (0 = low, 3 = high), used as a continuous variable.

Dependent variables

We used four dependent variables for four separate analyses:

- the *number of hours* per week principals spend for their schools;
- principals' time allocation for instructional leadership[8] (i.e., *percentage* of their time allocation for this responsibility);
- principals' time allocation for administration;
- principals' time allocation for interacting with parents and the community.

Data analysis

Because the dataset incorporated a unit of analysis (i.e., principals) that was nested within a larger unit (societies), we employed a two-level hierarchical linear model (Raudenbush & Bryk, 2002). Due to the original variables having missing cases ranging from 5.1% (e.g., home-school involvement) to 14.2% (e.g., proportion of immigrant students), we carried out a multiple imputation analysis prior to conducting the HLM analysis. To prevent imputed values from falling outside a reasonable range of values, a custom imputation model with constraints on the variables was used.[9] Consequently, five datasets representing simulated versions of the sample were created. These five complete datasets (each contained imputed values for the missing values) were analyzed using HLM.

By setting up a random-effects ANOVA model, we identified an intra-class correlation coefficient (ICC) for each dependent variable. We then built explanatory models by adding Level 1 (school characteristics) and Level 2 variables (national-level characteristics) in order. The final HLM model was constructed using a random-intercept model (Raudenbush & Bryk, 2002). We used this approach for three reasons. First, some Level 1 slopes did not significantly vary across the societies. Second, the deviance statistic indicated that allowing these slopes to vary across the societies did not fit the data significantly better than specifying them as fixed. Finally, significant cross-level interaction was not identified.

While we used the same Level 1 predictors as control variables in the final model for all four dependent variables, Level 2 predictors were selectively employed in the final model based on whether deviance statistics were significant.[10] That is, we regressed each dependent variable on Level 2 predictors in the final model only if adding the Level 2 predictor contributed to a significantly better model fit. Another reason for this approach was to make the final model parsimonious given the small number of level units.

We then ran each of the five datasets through HLM 6.8 software. The estimated parameters for variables in the model from the five datasets were averaged to yield a single estimate. Standard errors were calculated by considering the within- and between-imputation variation in the parameter estimates. Additionally, we used a

school weight variable originally generated from the IEA's international database software for taking into account any sample schools that did not participate and were not replaced in the PIRLS 2006 dataset.

Limitations

We wish to acknowledge several limitations of this study. First, this study does not focus on how various personal characteristics (e.g., age, gender, year of administration/teaching) may influence principals' use of time (Bossert et al., 1982). While this remains a limitation of this study, previous studies have reported that features of the school as an organizational context explain more of the variance in principals' priorities than personal characteristics (Goldring et al., 2008; Leithwood et al., 2004).

Second, since some countries yielded more than one participating unit, using each unit's PDI is more appropriate than using country-level information. However, this study relied solely on country-level PDIs because information at the sub-unit level was not currently available. This is a limitation facing not only this study but also other cross-national studies using Hofstede's data.

Third, while the PIRLS dataset was based on the year 2006, the PDI measures were initially obtained between 1967 and 1973, and later extended in 1982. This time lag between the datasets represents a potential limitation. At the same time, however, prior studies have suggested that national cultural characteristics are extremely stable over time and only change slowly over the long term (Helmreich & Merritt, 1998; Hofstede, 1997, 2001; Hoppe, 1993; House et al., 2004).

Fourth, this study relies on a large secondary dataset and, therefore, is subject to common limitations of using data that were not intended for the particular study. Moreover, both research design and variable selection limit our ability to provide detailed explanations for the specific pattern of results that we report. Despite these limitations, our analysis begins to shed some light on a series of issues previously suggested but never empirically explored in this literature.

Fifth, we sought to identify cross-level interactions between national contexts and organizational contexts in association with principals' time allocation; for example, the effect of higher levels of national economy on the number of hours principals spend for their schools could be moderated by higher levels of school poverty. Even though our data suggest that there were no statistically significant cross-level interactions, future studies should seek to capture a more complete picture of interactions between national and organizational contexts and their mutual influence on principals' practice.

Sixth, we used robust standard errors for the estimation of fixed effects in order to address concern about the normality assumption of the variables. However, given the small number of Level 2 units in this study, we acknowledge that robust estimation may have a limitation in achieving its best performance (Cheong, Fotiu, & Raudenbush, 2001).

Finally, we emphasize that this study focused on overall patterns of principals' time use across the societies. Describing the differential effects of national-level factors on principals' time allocation within "each individual society" was beyond the scope of the study. The rationale for this approach derives from the lack of large-scale studies that reveal how particular national characteristics contribute to variance in principals' behavior in general and time use in particular.

Results

Figure 1 presents the average number of hours per week principals spend working for their schools across the 34 societies. We note first that the average work week among principals across the sample internationally was 41.4 hr (see the dotted line in the figure). The data reveal that principals from Western European and North American societies tended to spend more time in their jobs, on average, than their counterparts from African, Middle Eastern, and Asian societies. Moreover, the extent of variation was substantial. For example, principals from the four Canadian provinces included in the PIRLS dataset tended to spend *4 times more hours per week* in their school leadership roles (i.e., about 54 hr per week) than principals from Kuwait (13.7 hr) and 2.5 times as many as principals in Indonesia (22.2 hr). This suggests a clear pattern of cross-national variation in principals' time use, as well as an initial indication that national contexts were shaping how principals used their time.

The boxplots in Figure 2 provide more detailed information regarding variation in principals' time use by illustrating the distribution within and between countries. The slightly thicker horizontal lines in the tinted boxes indicate the median work hours per week. The tinted boxes show the middle 50% of principals' work hours. The distance between the top edges of the tinted boxes and the upper horizontal lines
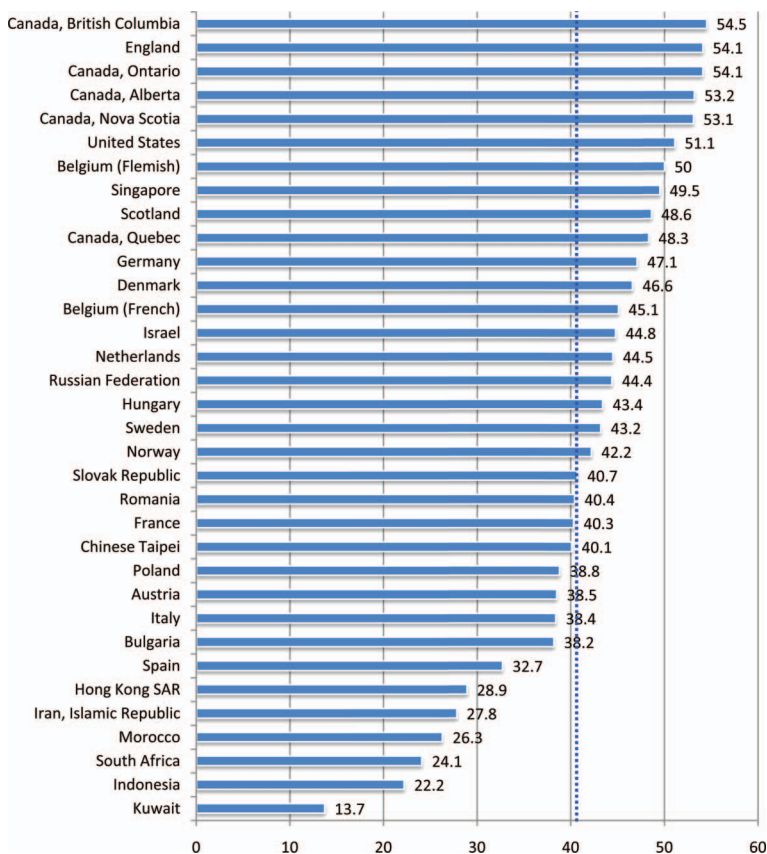

Figure 1.   Average hours per week principals spend for schools by societies.
Note: The results in this figure are reconstructed from the School Almanac file in the PIRLS 2006, and thus this table indicates the results before the multiple imputations.

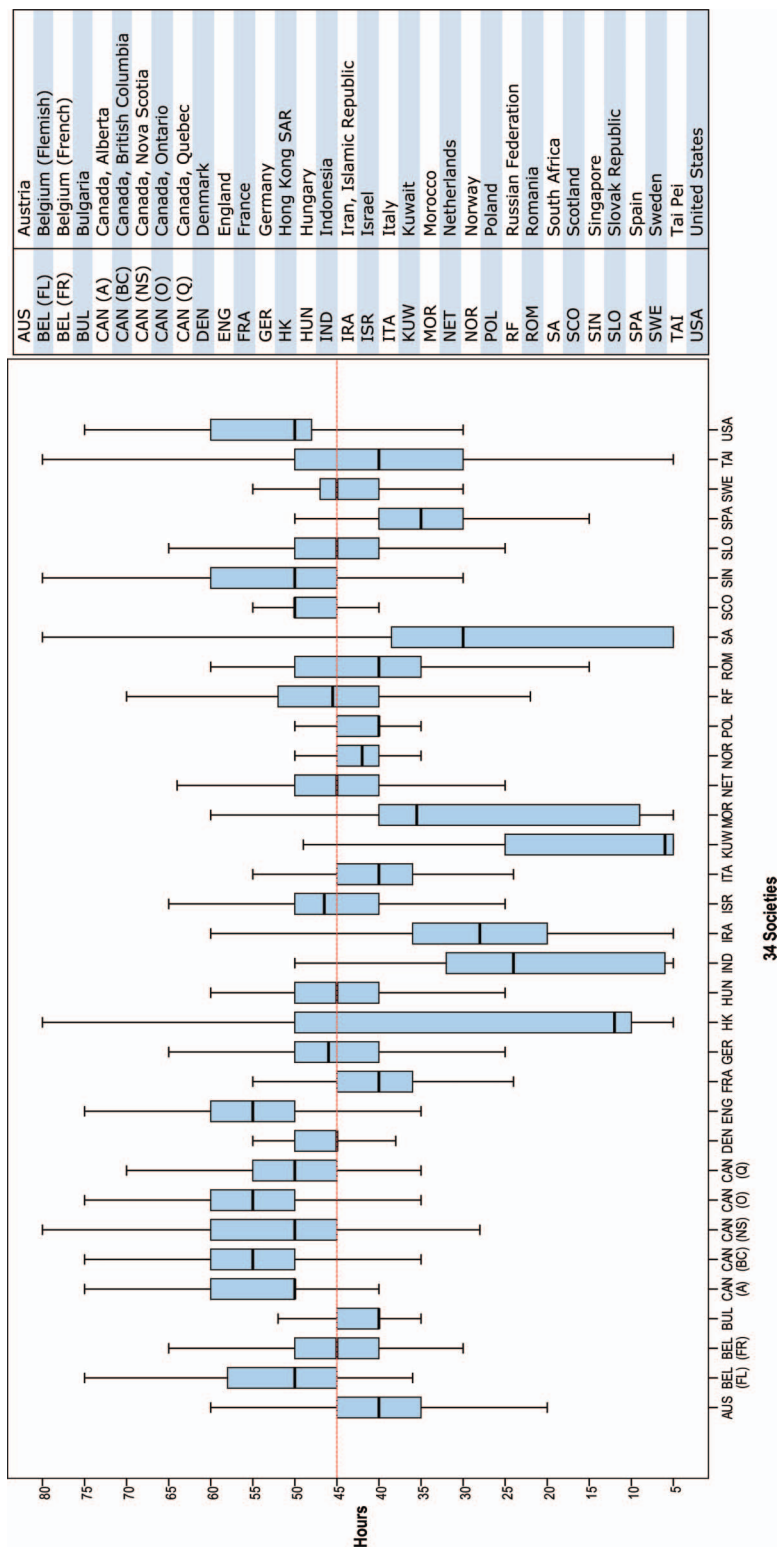| AUS | Austria |
BEL (FL)	Belgium (Flemish)
BEL (FR)	Belgium (French)
BUL	Bulgaria
CAN (A)	Canada, Alberta
CAN (BC)	Canada, British Columbia
CAN (NS)	Canada, Nova Scotia
CAN (O)	Canada, Ontario
CAN (Q)	Canada, Quebec
DEN	Denmark
ENG	England
FRA	France
GER	Germany
HK	Hong Kong SAR
HUN	Hungary
IND	Indonesia
IRA	Iran, Islamic Republic
ISR	Israel
ITA	Italy
KUW	Kuwait
MOR	Morocco
NET	Netherlands
NOR	Norway
POL	Poland
RF	Russian Federation
ROM	Romania
SA	South Africa
SCO	Scotland
SIN	Singapore
SLO	Slovak Republic
SPA	Spain
SWE	Sweden
TAI	Tai Pei
USA	United States

Figure 2.   Within and between variation in hours per week principals spend for schools.
Note: The figure is constructed from the dataset before the multiple imputations. Missing values are not included in the figure. Outliers are included in the figure, yet they are not visualized. And some extremely outlying values are top-coded (80 hr or more than 80) or bottom-coded (5 hr or less than 5) in this figure.

indicate the top 25% of principals' work hours. Likewise, the distance between the bottom edges of the tinted boxes and the bottom horizontal lines indicate the bottom 25% of principals' work hours. The wide range of medians in the boxplots highlights the striking variation in principals' work hours between and within societies.

We note that some societies had considerably larger within-society variance in principals' work hours (e.g., Indonesia, Morocco, South Africa) than others (e.g., Bulgaria, Poland, Denmark, Norway, Scotland). This suggests the possibility that organizational and societal contexts exert different effects on principals. For example, the principals in the former societies might be more influenced by features of the organizational contexts in which they work. National contexts might have a relatively greater influence on principals' work in the latter societies.

Hierarchical linear modeling on overall time use

Subsequent HLM analyses confirmed this impression of substantial cross-national variance in principals' time use. A random-effects ANOVA model (null model or Model 1 in Table 1) showed that the average work week among the principals varied significantly across the 34 societies (associated intra-class correlation

Table 1. Hours per week principals spend for schools[a].

Fixed effects[b]	Average Hours		
	Model 1	Model 2	Model 3
Overall mean hours γ_{00}	34.6 (4.5)***	36.7 (3.6)***	42.1 (1.1)***
GDP per capita (ppps) γ_{01}			8.84 (1.19)***
Students in free or reduced-price lunch γ_{10}		1.07 (1.13)	1.07 (0.98)
Immigrant students γ_{20}		0.28 (0.26)	0.31 (0.27)
Lack of school resources γ_{30}		−1.69 (1.08)**	−1.59 (0.44)**
Negative school climate γ_{40}		1.63 (1.12)	1.61 (1.12)
Lack of school safety γ_{50}		−2.17 (0.52)***	−2.11 (0.51)***
Home-school involvement γ_{60}		1.40 (0.85)	1.30 (0.82)
School size γ_{70}		0.47 (1.05)	0.48 (1.05)
Suburban γ_{80} (urban as the reference)		−0.63 (0.61)	−0.65 (0.61)
Rural γ_{90}		−1.15 (1.29)	−1.08 (1.29)

Random effects	v.c.	df	p value	v.c.	df	p value	v.c.	df	p value
Mean hours u_{0j}	113.5	33	0.000	83.6	33	0.000	22.5	32	0.000
Level 1 effect r_{ij}	210.2			205.5			205.5		
Variance between societies explained (%)				26.3			80.2		
Variance within societies explained (%)				2.2			2.2		
Total variance explained (%)							29.6		
Intra-class correlation coefficient (ICC)					.350				

Notes: [a]5,927 principals from 34 societies, effect = coefficient; *$p < .05$. **$p < .01$. ***$p < .001$, v.c. = variance component, df = degree of freedom. [b]Robust standard errors for the estimation of fixed effects were used due to concern about the normality assumption of the variable.

coefficient of .350 [=113.5/(113.5 + 210.2)]). This means that 35% of the variance in the mean hours in the principals' work week lies *between the 34 societies*. Based on this dependency, we built explanatory models by adding Level 1 (school characteristics, Model 2 in Table 1) and Level 2 variables (society characteristics, Model 3 in Table 1).

Table 1 presents the HLM results from the null model to the final model (a random-intercept model) for the dependent variable of average hours per week spent in the job role. The final model shows that GDP per capita, one of our key national contexts of interest, was significantly associated with an increase in principal time-on-the-job. Principals from societies with higher GDPs were likely to spend more time for schools than their counterparts from societies with lower GDPs. The other Level 2 predictors were not included because the two predictors were not significant and adding them did not contribute to better model fit. The final model explained about 80% of the variance between the societies.

Hierarchical linear modeling on time allocation to different work domains

Table 2 further illustrates how national contexts influenced principals' time allocation to three key domains of responsibility: instructional leadership, administration, and interacting with parents and the community. This presents the same final model (i.e., Model 3 as in Table 1) that was used in predicting the number of hours per week principals spend in their work role.

Time allocation for instructional leadership

With respect to instructional leadership, approximately 15% of principals' work time across the societies was allocated for this domain of activity after controlling for other predictors. In terms of national contexts, higher GDP per capita was significantly associated with a *decrease* in principals' time allocation for instructional leadership (-6.5^{***}). This is an interesting finding in that the previous HLM analysis indicated a positive association between higher GDP and the number of hours principals spend working for their job. Although principals in developed countries tended to spend more time working for their schools on average, they tended to allocate less of that time on instructional leadership than counterparts in less developed countries. Thus, our analysis revealed that the absolute number of hours principals in developed countries spend on instructional leadership was still higher than counterparts in many developing societies.

For investigating this, we calculated specific hours each principal spends for instructional leadership by multiplying each principal's work hours per week and time allocation (i.e., percentage) for instructional leadership; for example, if a principal's work hours per week is 50 and her time allocation for instructional leadership is 20%, then the calculated hours for the activity is 10. In this way, we calculated specific work hours for different work domains including instructional leadership, which is illustrated in Table 3.

We then categorized principals into three groups based on national GDP: low (GDP < 20,000 US dollars), mid (20,000 ≤ GDP < 40,000), and high (40,000 ≤ GDP < 60,000).[11] The descriptive result presented in Table 4 shows that principals from societies with high GDP countries (5.99 hr were likely to spend more time for instructional leadership than their counterparts from societies with mid (5.94 hr) and

Table 2.   Principals' time allocation for key responsibilities[a].

Fixed effects[b]	Instructional Leadership Model 3	Administration Model 3	Parent and Community Model 3
For adjusted grand mean γ_{00}	15.2 (0.67)***	22.7 (0.89)***	14.6 (0.49)***
GDP per capita (ppps) γ_{01}	−6.56 (1.06)***		
PDI γ_{02}	−0.07 (0.04)†		−0.05 (0.02)†
Standardization of education system γ_{03}		−4.95 (0.76)***	1.19 (0.80)
Students in free or reduced-price lunch γ_{10}	0.95 (0.69)	−0.05 (0.33)	0.23 (0.51)
Immigrant students γ_{20}	0.50 (0.31)	0.11 (0.23)	−0.04 (0.19)
Lack of school resources γ_{30}	0.53 (0.38)	−0.38 (0.28)	−0.02 (0.54)
Negative school climate γ_{40}	−2.46 (0.71)**	1.11 (0.89)	−0.30 (0.19)
Lack of school safety γ_{50}	0.24 (0.38)	0.93 (0.55)†	−0.04 (0.22)
Home-school involvement γ_{60}	−0.80 (0.90)	0.52 (0.32)	0.14 (0.27)
School size γ_{70}	2.19 (0.74)**	0.48 (0.82)	1.08 (0.50)*
Suburban γ_{80} (urban as the reference)	0.66 (0.60)	−0.73 (0.98)	−1.14 (0.59)†
Rural γ_{90}	0.27 (0.90)	−2.07 (0.96)*	−1.29 (0.35)**

Random effects	v.c.	df	p value	v.c.	df	p value	v.c.	df	p value
Mean u_{0j}	8.2	31	.000	9.1	32	.000	2.8	31	0.000
Level 1 effect r_{ij}	141.3			137.1			49.7		
Variance between societies explained (%)	80.3			60.3			38.5		
Variance within societies explained (%)	3.3			1.2			2.5		
Total variance explained (%)	20.4			9.6			5.4		
Intra-class correlation coefficient (ICC)	0.222			0.142			0.082		

Notes: [a]5,927 principals from 34 societies, effect = coefficient; † $p < .10$ *$p < .05$. **$p < .01$. ***$p < .001$, v.c. = variance component, df = degree of freedom. [b]Robust standard errors for the estimation of fixed effects were used due to concern about the normality assumption of the variables.

low GDP countries (5.37 hr). Although Levene's tests were not satisfied with four of the five imputed datasets, ANOVA tests of each dataset showed that there were significant group differences in the hours allocated for instructional leadership; Data 1, $F(2, 5924) = 8.61$; Data 2, $F(2, 5924) = 10.86$; Data 3, $F(2, 5924) = 10.31$; Data 4, $F(2, 5924) = 11.27$; and Data 5, $F(2, 5924) = 11.04$ at the level of $p = .000$. Follow-up post-hoc analyses using Hochberg's GT2 and Games-Howell indicated that there were significant effects on national economy on the hours allocated for instructional leadership between principals from low GDP countries and their counterparts from mid and high GDP countries. In other words, principals in economically developed societies were likely to spend more time for instructional leadership than their counterparts from less economically developed societies.

Higher PDIs were *negatively* associated with principals' time allocation for instructional leadership ($-.07$) at a borderline level ($p = 0.077$). This implies that principals in societies with greater status differentiation may have delegated

Table 3. Average work hours per week for individual tasks across societies.

Individual Tasks	Data 1	Data 2	Data 3	Data 4	Data 5	Mean of Means
Instructional Leadership	5.75 (4.72)	5.76 (4.76)	5.72 (4.70)	5.76 (4.72)	5.74 (4.72)	5.75 (4.72)
Administration	9.89 (7.91)	9.92 (8.01)	9.87 (7.86)	9.93 (7.89)	9.88 (7.89)	9.90 (7.91)
Parent/Community	5.52 (4.02)	5.54 (4.02)	5.52 (4.01)	5.52 (4.00)	5.52 (4.01)	5.52 (4.01)
Others	19.70 (10.27)	19.67 (10.23)	19.71 (10.27)	19.63 (10.18)	19.67 (10.19)	19.67 (10.23)

Note: $N = 5,927$, ( ) = standard deviations. Each imputed dataset included a few cases (2 to 6) having negative values of the category of "Others" because those cases indicated their time allocation more than 100 in the percentage format. Since the category of "Others" was calculated by {100 − (allocated percentages for the three main tasks), those cases came to have negative values of "Others." Since negative values of time allocation is not possible in a real context, they were bottom-coded as 0.

Table 4. Average work hours per week for instructional leadership by the levels of national economy.

	Data 1	Data 2	Data 3	Data 4	Data 5	Mean of Means
Principals from low GDP ($n = 2,094$)	5.41 (4.98)	5.37 (4.98)	5.34 (4.97)	5.37 (4.95)	5.36 (4.93)	5.37 (4.96)
Principals from mid GDP ($n = 3,037$)	5.95 (4.52)	5.96 (4.57)	5.91 (4.48)	5.97 (4.52)	5.93 (4.51)	5.94 (4.52)
Principals from high GDP ($n = 796$)	5.92 (4.72)	6.01 (4.77)	5.97 (4.76)	5.99 (4.73)	6.05 (4.86)	5.99 (4.77)

instructional leadership responsibilities more than principals in low-PDI societies. Although the PDI coefficient was small ($-.07$) and only significant at the borderline level, it might still be potentially important. We make this notation in consideration of the wide-range of PDIs across societies (i.e., from 11 to 104) and the contribution that PDI makes towards explaining the variance between the societies; the final model explained about 80% of the variance between the societies.

Time allocation for administration

The HLM results showed that principals across the societies allocated approximately 23% of their work time for administrative duties after controlling for other predictors. Notably, the largest effect on principals' time allocation for administration came from the degree of standardization of the education system ($-4.95***$). Greater standardization was negatively associated with time allocation for administration, indicating that principals in more structured systems spent *less time on administration* than counterparts in less standardized systems. About 60% of the variance in principals' time allocation for administration between the societies was explained by standardization of education system alone.

Time allocation for interacting with parents and community

Finally, the same analyses were run with respect to principals' time allocation for relationships with parent-community. In terms of national contexts, PDI indicated a significant association at a borderline level ($-0.05, p = 0.056$). While the coefficient of PDI was small ($-.07$), again we suggest that the wide-range of PDIs and its contribution to explaining the variance between the societies need to be considered.

Conclusion

This study was an initial empirical exploration into how "macrolevel context" factors influence principal time use and allocation across 34 nations. Through analysis of a large international dataset, we identified five distinctive patterns of macrolevel context effects. We will discuss these main findings and their implications, especially with respect to future research.

First, principals from societies with higher GDP tended to spend more time on the job. Moreover, the extent of variation was often quite striking. We speculate that this finding could reflect a need among principals in poorer countries to work in second jobs due to lower wages. If true, this would parallel the condition of teachers in developing nations who often spend considerable amounts of time working at second jobs (Bray, 1999; M. Lee, 2006). This pattern of results could also be traced to differences in normative conceptions and structural definitions of the principal's job role. As societies develop economically, there could be a tendency to create a more professional management role for principals, and in so doing it demands greater time commitment to the job (see March, 1978). However, these explanations are speculative and suggest the need for more purposively designed investigations that examine potential sources of this variation.

Second, while principals in developed nations allocated a smaller *percentage of their time* on instructional leadership, given their longer work week, they still spent *more total time per week* in this domain than counterparts in developing societies. Again, we note that these findings were subject to considerable within-group variation. While it is beyond the scope of the present study to arrive at a conclusive explanation for this pattern of results, the findings again provide a starting point for further empirical research.

Third, principals from less hierarchically organized societies tended to allocate more time for instructional leadership than principals from societies with higher PDIs. We note that tasks in this domain often require collaboration with teachers. Principals in less hierarchical societies may find it easier to establish the type of collegial relationships that form a foundation for sustainable instructional leadership (e.g., Barth, 1990; Blasé & Blasé, 1996). In contrast, principals in higher PDI countries may assume a more "traditional head of school" role and delegate instructional leadership activities to others. Indeed, previous research conducted in more hierarchically structured societies has found that instructional leadership is often understood as principals' intrusion into the domain of teachers (e.g., Hallinger, 2004; S.-Y. Lee, 2005; Walker & Dimmock, 2000).

Fourth, principals in more structured education systems reportedly allocated *less of their time for administration*. Greater formalization may reduce uncertainties in addressing administrative duties. Of course, while we can propose plausible explanations for this finding, it also requires more in-depth exploration.

Finally, principals in less hierarchical societies appear to allocate more time for interacting with parents and community. We note that parents in higher PDI societies may feel intimidated by higher status professional staff and, therefore, avoid formal interaction with the school. Conversely, parents in low-PDI societies may experience fewer barriers between the school and its community and interact with the school administration accordingly. This finding is supported by scholarship which suggests that schools mirror the values of the societies in which they operate (Tyack & Hansot, 1982).

In conclusion, we argue that national contexts exert a potentially important influence in determining how principals allocate and use their time. Moreover, different national contexts influence principals' time use and allocation for particular job domains in distinctive ways. The research begins to shed light on how macrolevel context factors influence school principals. Of course, by its nature, this research did not delve into organization-level sources of the variation or link principal behavior to teaching and learning in schools. Nonetheless, we suggest that the study points

towards a new horizon for investigation into educational leadership in this global era. The next logical step is to explore how macrolevel contexts moderate principals' exercise of leadership and students' learning outcomes.

Notes

1. An earlier version was presented at the 4th IEA International Research Conference held at the University of Gothenburg, Sweden (July, 2010).
2. For the purposes of this study, we refer to time use as the number of working hours principals spend on-the-job, and time allocation as the apportionment of that time to different tasks and activities.
3. There were a few countries whose regions participated in PIRLS 2006 independently (e.g., five Canadian provinces participated in PIRLS 2006 separately).
4. Because principals completing the School Questionnaires of Norway (5th graders) are the same sample populations as principals responding to the School Questionnaire of Norway (4th graders), information from Norway (5th graders) was excluded.
5. The Cronbach's alpha reliability coefficient is based on the average of the Cronbach's alpha for individual societies (see the IEA's technical report by M.O. Martin et al., 2007).
6. Specifically, the highest value means that schools hold teacher–parent conferences and events at school four or more times per year that are attended by more than half of the parents (see M.O. Martin et al., 2007).
7. As mentioned earlier, there were a few countries whose regions participated in PIRLS 2006 independently. Therefore, a further effort was made for obtaining more relevant information of GDP per capita (PPPs) at the subcountry level for countries such as Canada by further gathering information from different sources such as Statistics Canada (for obtaining province level of GDP), Bank of Canada (for calculating currency exchange rate to US dollars), and Organisation for Economic Co-operation and Development (for obtaining Purchasing Power Parities Data of Canada).
8. Although the term used in the PIRLS survey is curriculum and pedagogical development, we have substituted instructional leadership in this article in order to maintain consistency with the underlying literature.
9. The imputation model is compatible with the model used in this study (see Allison, 2002, for more details).
10. We checked the deviance statistics from each of five imputed datasets, respectively. The average deviance statistics was, then, calculated from using a SAS macro that combines chi-square statistics from the five separate HLM analyses.
11. Note that GDP per capita (PPPs) was used as a continuous variable for the HLM analyses, whereas it was used as a categorical variable for a simple comparison illustrated in Table 4. Societies with low GDP based on PPPs: Slovak, Russia, Romania, Kuwait, Indonesia, Morocco, Bulgaria, Poland, Iran, South Africa, and Hungary. Societies with mid GDP based on PPPs: Singapore, Hong Kong, France, Belgium (French), Belgium (Flemish), Taipei, Spain, Italy, Canada (Nova Scotia), Canada (Quebec), The Netherlands, Germany, Scotland, England, Sweden, Denmark, Israel, and Austria. Societies with high GDP based on PPPs: USA, Canada (British Columbia), Canada (Ontario), Canada (Alberta), and Norway.

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Appendix 1.   Correlation matrix between national contexts.

	GDP (natural logarithm)	PDI	Standardization of Education System
GDP (natural logarithm)	1	−.585**	−.382*
PDI	−.585**	1	.244
Standardization of Education System	−.382*	.244	1

$N = 34$, *$p < .05$. **$p < .01$. ***$p < .001$.