

Article

# Development and Confirmatory Factor Analysis of the Organisational Communication in Primary Schools Questionnaire

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**Abstract:** This article describes the development and subsequent testing of scales representing functions and features of school communication among staff in Australian primary schools using the Organisational Communication in Primary Schools Questionnaire (OCPSQ). The OCPSQ was developed to measure aspects of communication occurring vertically between school leadership and staff members and horizontally among staff members. Elements of classical, human relations, and cultural theories were used to guide questionnaire development. Items were developed to represent theorised communication constructs derived from previous literature. Exploratory factor analysis was used to identify the underlying structure of aspects of communication. Confirmatory factor analysis was employed as a validation of the OCPSQ and its constructs. An interpretable ten-factor solution, representing salient functions and features of organisational communication, was established. Scales generated by the OCPSQ were found to have high reliabilities. The scales represented supportive, directive, cultural, and democratic functions, as well as features of communication relating to openness and load.

**Keywords:** organisational communication; primary schools; functions; features; factor analysis

## 1. Introduction

Organisational communication has been investigated by researchers in various contexts, mostly relating to business and corporate management [1,2]. There has been much less research attention on organisational communication in schools. The research that does exist has focused on a single or small number of aspects of communication, often in relation to school climate, leadership, or teacher effectiveness [3–6]. These studies have reported useful findings about how organisational communication influences various facets of school work and perceptions of work environments. However, the use of only a limited number of the possible aspects of organisational communication as foci results inevitably in inadequate explanations of phenomena.

After reviewing the research on relationships between aspects of organisational communication and specific phenomena, such as job satisfaction and stress as part of a larger research project, the need for an instrument that can measure a comprehensive range of aspects of organisational communication in schools became apparent. For example, there are a number of studies that have investigated links between support from school leadership and colleagues and job satisfaction [7–10]. Other studies have attempted to link directive communication from principals to job satisfaction [11]. The problem is that focusing on only one or two aspects of organisational communication leads to limited explanations of relationships, ignoring the potential influences of other communication variables. Taking job stress as another example, different studies have reported a range of aspects of organisational communication that may influence this job attitude, such as information overload [12], direction from the principal [13], and interactions related to participation in decision-making [14].

The inclusion of a limited range of communication variables in empirical research makes it difficult, if not impossible, to determine which aspects of communication are more important than others in relation to job attitudes, school effectiveness, or any other facet of work in schools. What has been deficient in the literature until recently is the availability of a comprehensive range of organisational communication variables that can be measured and then used to examine impacts on a variety of facets of work for teachers and other staff in schools. Primary schools (also known as elementary schools) in particular have been under-researched in terms of organisational communication. They have been described as having flatter hierarchical structures compared to secondary schools (also known as high schools) and combined schools [15,16]. For this reason, an instrument designed to measure organisational communication in primary schools becomes valuable to researchers wishing to investigate how communication influences such organisations. The research question guiding the project was: *What are the salient aspects of organisational communication among staff that can be measured in primary schools?*

## 2. Theoretical Framework

The purpose of the Organisational Communication in Primary Schools Questionnaire (OCPSQ) was to measure aspects of organisational communication between leadership and staff, as well as among staff, in schools so that resultant constructs could be associated with job attitudes of school staff as part of a wider research agenda. Of course, it is recognised that school communities comprise more than just staff. There are the students, there are also parents and guardians, as well as others engaging in communication with one another and the staff in what Marsh, Clarke, and Pittaway have described as the “communication links of a school” [17] (p. 169). There are behaviours, such as relationship-building, that are common to all interactions among groups in a school [18]. However, communication among staff and between school leaders and staff will be largely focused on the core business of the school [17,19] and the organisation and support of efforts related to that, as opposed to interactions between teachers and students for example, which relate mostly to instruction and various aspects of the duty of care [18,20].

The aspects studied here concerned communication between school leaders and staff and among staff, within the bounded space of a school, and the functions and features of those interactions. It was therefore appropriate that a classic process model of communication based on the early work of Schramm [21] and Berlo [22] was utilised. This well-known model depicts messages (which include feedback loops) between senders and receivers as occurring through channels [23]. The channels are the methods of communication as well as the directions of flow, experienced as downward, upward (between staff and leadership), and horizontal (between staff) interactions [24]. The process model also depicts elements of senders, receivers, and the organisational environment that may interfere with the accuracy of communication, commonly referred to as “noise” [23].

The concept of noise provides a useful segue way to features of organisational communication, as noise (by way of physical sound, intentional distortions of information, and perception problems) is often labelled as a feature of communication [25]. Another commonly mentioned feature of organisational communication is load. Communication load can be experienced in the form of volume of messages, as well as message complexity [26]. Another feature of communication identified in the field or organisational communication is timeliness of information [27].

In addition to the mechanics of the communication process and its features, it is also important to recognise functions of messages in organisations. Classical organisation theory posits that interactions may relate to execution of tasks, innovation or change, and maintaining relationships. Task messages flow normally downward from leadership echelons to staff in the form of directions or rules. Messages about change or innovation may also be downward, whilst messages aimed at maintaining relationships may generally be in the form of affirmation from leaders or managers to staff members [24,26]. Horizontal communication is not strongly emphasised, except to solve work-related problems that referral upward and waiting for downward responses would limit [28].

Classical theory, however, does little else to explain the nature of relationship-oriented interactions and downplays the amount of two-way interaction that may occur between staff and leadership, especially in the upward direction of flow in modern organisations [29]. Human relations theory (and the subsequent human resources movement) suggests that organisational communication serves to satisfy human needs such as affiliation and involvement. It provides an elaboration of relationship-oriented communication by emphasizing the role of support giving between leadership and staff (in both directions) and the need for social and professional support among staff [24,27]. Human relations theory also introduced an emphasis on democratic forms of communication, such as the work of teams and participation of staff in decision-making [25,28]. The support giving and participation in decision-making characteristics of communication suggested by human relations theory requires a level of openness to work effectively [25]. Openness of communication is the degree to which interactions are honest, candid, and free of any distortion [30]. Given the reference to distortion, it is important to note that the literature suggests openness to be a salient feature of the organisational climate in schools [30,31].

Cultural theory provides further insight into the functions of communication in organisations. Through the models of organisational culture described by Deal and Kennedy [32], Schein [33], and others [17,24,34], it is known that, just as organisational culture can shape communication within it, communication is the way organisational cultures are developed and maintained. Cultural theory tells us that another function of organisational communication in schools is to maintain the existing beliefs, values, and ways of doing things as well as to initiate change through leadership vision sharing and negotiation of new meanings [24,26].

Goldhaber [34] (p. 23) referred to the beliefs, values, symbols, and behaviours indicative of organisational culture as the “internal environment”. This is an accurate way to describe schools, given the strong symbolism and values often attributed to them [15]. Goldhaber also referred to organisations as operating in a wider community, which he called the “external environment” [34] (p. 24). This is true for schools, given that they draw their clientele from the local community and often interact with the community in a variety of ways [18].

The theoretical framework of communication guiding the study reported here, therefore, is based on a process model of organisational communication incorporating people who send messages and those who receive them and provide feedback, with messages that occur via channels (downward, upward, and horizontal) within the school. Features of organisational communication in schools are likely to include levels of perceived noise, load, and openness. Functions of school organisational communication are expected to include direction, support, participation in decision-making, and culture transmission. These interactions occur within an internal environment bounded by members of the school community, but it is recognised that schools operate in a wider external environment. A more detailed account of the resulting model of communication is presented elsewhere [35].

The nature of communication among staff in schools can be explored through the interactions that take place, as well as the perceived qualities of organisational communication in those schools. With this in mind, the purpose of this article was to explore the features and functions of communication, as measured by the OCPSQ, by way of exploratory and confirmatory factor analysis. As measurement is an aim of the research the investigation was conducted using a positivist research method.

### 3. Materials and Methods

In this section, the development of the OCPSQ is explained to provide the background and context for the methodology and results of the current study. Findings from previous studies that employed the instrument are also described. This is followed by an explanation of the method for the current study.

#### 3.1. Development of the OCPSQ

There are a number of questionnaire-based instruments available to measure organisational communication. The Organisational Communication Questionnaire developed by Roberts and

O'Reilly [36] measured accuracy and overload in particular, and direction of flow in general terms. The International Communication Association Audit, developed by organisational communication researchers within the International Communication Association in the 1970s [34], measured a more extensive set of aspects of communication such as accuracy, timeliness, adequacy, and clarity. Other instruments, while very reliable, have a very narrow focus, such as the Superior-Subordinate Communicative Openness Scale, developed by Jablin [37]. None of these instruments have attempted to measure a wider range of communication variables that includes other aspects of communication, such as directive and supportive communication, although Jablin's later work included supportive communication using another instrument [38].

The lack of a comprehensive measure of organisational communication that could also be utilised in primary schools led to the development of the OCPSQ. This new instrument was developed to measure the aspects of organisational communication that were identified from a comprehensive literature review [39]. The review identified four main functions of communication in schools—supportive, directive, cultural, and democratic—as well as two prevailing features—openness and load.

Supportive communication, often described as collegial support and administrative support, occurs in several ways across vertical and horizontal channels, including expressions of concern, praise and appreciation, and encouragement [31,40,41]. Supportive communication can also be construed from collegial support given for work-related problems [9], as well as social support [42]. Directive communication occurs as a range of interactions from simple instruction giving to overt persuasion [43,44], all with the goal of ensuring staff members are compliant [3,11]. By its nature, it usually only occurs as a downward flow from principal to staff. Although the term was used more than thirty years ago by Carbaugh [45], cultural communication is not a concept that has been widely researched on its own, but may be inferred from wider studies of organisational culture transmission. For example, Shockley-Zalabak and Morley [46] reported on the influence that value and rules sharing between leaders and subordinates had on shaping the culture of an organisation. Myers and McPhee [47] reported on behaviours congruent with cultural communication when they described acculturation processes in groups. The term refers to interactions that help to transmit and maintain school culture and may include a range of activities from induction and mentoring to sharing of school history, philosophy, and even vision and mission [48,49]. Democratic communication is a new term for activity that has been growing in prominence over the last two decades in schools: participation and collaboration in school decision-making [44,50,51]. Staff input into principal or leadership team decisions [52] and the work of teams and committees towards changing school policy [53] are some examples and described by others as participation [54–56]. Indeed, Stohl and Cheney [56] identified participation (in decision-making) as a variety of organisational communication.

The “features” of communication were theorised as being possible in all directions [36,37]. Openness of communication has been described as the degree of candidness and honesty of interactions [40] as well as the propensity of leaders to receive “bad news” without “shooting the messenger” [31,37]. Openness is underpinned by positive relationships and trust [10,38]. Communication load is concerned with the perceived amount of information and was approached as a continuum from overload (too much information or complexity) through adequacy (enough information to do work) to underload (not enough information to work effectively). Overload can be experienced as the sheer amount of information individuals receive [12], as well as high complexity of information received [57], which can lead to staff feeling overwhelmed and stressed [58,59]. Adequacy is the perception of having enough information to know what is going on in the organisation [60] and, importantly, to complete work [61,62]. Underload has been described as the experience of not having enough information due to it not being delivered or being difficult to access [63]. However, this aspect of organisational communication is not well researched as a construct on its own. Different experiences of load needed to be identified by separate items (representing overload, underload, and adequacy) in any instrument design. However, underload could probably be construed by low levels of adequacy [61,64].

While these aspects of communication are theorised as distinct constructs, it is known that interactions can serve more than one function [26], and features of communication, such as openness, can be coloured by the experience of some functions, such as supportive and directive communication, and vice versa [25,31]. For example, openness between people would encourage support giving [40], and it would not be hard to imagine a principal providing direction and support at the same time. In this way, aspects of organisational communication may complement one another.

There were fifteen theoretical constructs identified from the literature review. Literature from corporate and other sectors were included due to the scarcity of studies of communication in schools and in order to account for a comprehensive range of aspects of communication. Items depicting functions and features were generated. Possible directions of flow (upwards, downward, and horizontal) needed to be accounted for by separate items. Between five and eight statements were initially written to represent each of the theoretical constructs depicting aspects of communication. Eighty-one items were developed for the initial draft of the instrument. Table 1 provides an overview of the constructs and sample items, and Figure 1 represents each aspect in terms of direction of flow. A comprehensive description of each theoretical construct can be found in a previous report on this instrument [65].

**Table 1.** Overview of theoretical constructs and items for the draft Organisational Communication in Primary Schools Questionnaire (OCPSQ).

Theoretical Construct	Description	Sample Items
<b>Functions</b>		
Downward supportive	The principal communicates moral or other support to staff members.	<ul style="list-style-type: none"> <li>– The principal provides staff with positive feedback about the job</li> <li>– The principal compliments staff</li> </ul>
Upward supportive	Staff members convey emotional or professional support to the principal.	<ul style="list-style-type: none"> <li>– Staff give emotional support to the principal</li> <li>– Staff have opportunities to make positive remarks to the principal about his/her work</li> </ul>
Horizontal supportive	Staff members communicate support and encouragement to one another.	<ul style="list-style-type: none"> <li>– Teachers at this school support one another</li> <li>– As a staff we help each other get through the day</li> </ul>
Downward directive	Directions and task information given to staff by the principal to ensure staff are compliant.	<ul style="list-style-type: none"> <li>– The principal tells staff how things are to be done</li> <li>–The principal often directs work</li> </ul>
Downward cultural	The principal communicates information about school mission or culture to staff.	<ul style="list-style-type: none"> <li>– Information about this school’s goals and mission comes from the principal</li> <li>– The principal is actively involved in the induction of new staff</li> </ul>
Horizontal cultural	Staff members share information about school culture, ethos, mission, or history, often with new staff.	<ul style="list-style-type: none"> <li>– Staff members show new staff “the ropes”</li> <li>– Staff give new employees information about how things should be done at this school</li> </ul>
Downward democratic	The principal communicates encouragement for staff participation in decision making.	<ul style="list-style-type: none"> <li>– The principal asks for input from the staff on policy issues</li> <li>– The principal indicates that the opinions of staff are worthwhile</li> </ul>
Upward democratic	Staff member involvement in school decision making through upward channels	<ul style="list-style-type: none"> <li>– Staff are able to influence the principal’s decisions</li> <li>– The principal allows staff to contribute their thoughts on an issue</li> </ul>

Table 1. Cont.

Theoretical Construct	Description	Sample Items
Horizontal democratic	Teamwork and collaboration are used to facilitate school decision-making and development.	<ul style="list-style-type: none"> <li>– Staff are encouraged to work with one another to change or review school decisions</li> <li>– The staff at this school make each other feel that they are part of a team</li> </ul>
<b>Features</b>		
Downward load	The amount of communication traffic from the principal to staff members.	Adequacy – Staff receive messages from the principal at appropriate times Overload – The principal sends too many messages Underload Evident if adequacy scores are low.
Upward load	Amount of communication from staff members to the principal.	Adequacy – There are adequate times to talk to the principal about work issues Overload – The principal gets more information than he/she can handle Underload Evident if adequacy scores are low.
Horizontal load	The volume of communication traffic among staff members.	Adequacy – Staff members generally have opportunities to meet informally Overload – There is too much information from other staff Underload Evident if adequacy scores are low.
Downward openness	The degree of trust and honesty reflected in communication from the principal to staff members.	<ul style="list-style-type: none"> <li>– The principal communicates honestly to staff</li> <li>– The principal reveals his/her true feelings about issues</li> </ul>
Upward openness	Honesty and trust apparent in communications from staff members to the principal	<ul style="list-style-type: none"> <li>– Staff are generally honest in their interactions with the principal</li> <li>– Staff withhold information from the principal</li> </ul>
Horizontal openness	The perceived honesty and candidness of interactions among staff.	<ul style="list-style-type: none"> <li>– Information that comes from other staff members is accurate</li> <li>– The staff at this school are honest and trustworthy</li> </ul>

Aspect	Direction of flow		
	Downward	Horizontal	Upward
<b>Functions</b>			
<b>Directive</b>			
<b>Cultural</b>			
<b>Supportive</b>			
<b>Democratic</b>			
<b>Features</b>			
<b>Load</b>			
<b>Openness</b>			

Figure 1. Theorised aspects of communication and directions of flow.



Also developed were two nested items about methods of communication. Respondents were required to rate a list of methods (staff meetings, informal meetings, pupil-delivered messages, memos, bulletin board, intercom/PA, handbook, email, and web/intranet) in terms of frequency and then effectiveness. An open-ended question asking about communication in the school generally was also added in order to capture information that might explain some of the responses [39]. They are mentioned here for the sake of completeness. However, as this paper concerns the theorised aspects of communication, further exploration of these three items will be the focus of another report.

In order to test the effectiveness of the statements and identify potential problems, twelve staff members of a primary school were invited to review the items and asked to make comments in terms of their appropriateness to the given constructs, clarity, grammar, and redundancy in the light of other items [66]. These staff members were from a school that was not involved in the subsequent studies, and included ten classroom teachers, five of whom were from the lower primary classes (Kindergarten, Year 1 and Year 2) and five from upper primary classes (Years 3 to 6). The two other staff included a cohort coordinator and a deputy principal. The statements were listed underneath a title frame that contained the name of the construct and, under that, brief phrases that were designed to help define the constructs for the reviewers. The staff members were asked to make comments alongside the items.

Feedback from this process resulted in the deletion of 12 items. Six items were regarded as too general and not focused, such as “Staff members are free to come talk to the principal for any reason” and “Staff at this school are generally open”. One item “Staff inform new staff members with information about the schools vision/goals/ethos” was considered too broad because of the three concepts mentioned, as well as confusing due to “ethos” not being a commonly used term. Five items were considered too similar to other items. For example “Staff provide support for one another” was considered to be practically the same as “Staff members at this school support one another” so the former was deleted. A further item “The principal is autocratic” (for directive communication) was criticised by two reviewers because the word “autocratic” might not be understood. As this item represented an extreme of directive communication from principals, however, it was retained.

Another four items were deleted because they were considered too complex or multidimensional according to guidelines suggested by Gay et al. [66]. An example of two kinds of complexity was “Staff have many opportunities to talk to the principal about work”. First of all, the word “many”, made the item a potential leading question that assumed such opportunities were indeed many. Secondly, the word was also a quantifier that might confound the resulting data, with respondents using “many” (a vague term) to provide responses that might not accurately reflect the intention of the item, which was to quantify upward load (adequacy). Multidimensional items are those that experts in the field describe as dealing with more than one concept [66,67]. An example of an item deleted due to this problem was “The staff at this school are honest and trustworthy” (see Table 1) related to two concepts, honesty and trust, which could potentially lead to inaccurate responses. A detailed explanation of this process is presented in an earlier report [39].

### 3.2. Outcomes of the First Two Studies Using the OCPSQ

The initial version of the OCPSQ was used in a study of relationships between aspects of organisational communication and job attitudes in Catholic schools of New South Wales, Australia, described in detail elsewhere [65,68]. The sample (n = 356) were from 52 schools across that state. The sample comprised more females than males, which is in line with the typical gender distributions in Australian primary schools [69] (male = 13.8%, female = 85.7%, unstated = 0.5%). The majority of participants had more than 10 years of experience working in schools (57.3%), and over a third had less experience (35.9%), while some did not state their years of experience (6.7%). The large majority or participants were classroom teachers (65.4%) or school executive members aside from principals (22.8%), while the remaining participants were non-teachers, such as teacher aides.

The OCPSQ comprised the 65 items remaining from the consultation process. To minimise response set bias [66] items from all aspects of communication were ordered in random fashion in

the questionnaire. Items 1 to 62 concerned the aspects of organisational communication described in Table 1. These items were presaged by instructions directing participants to indicate the extent to which each statement was symptomatic of communication practices at their schools by circling the appropriate response. Participants were required to respond to items about the extent to which each communication behaviour occurred in their schools on a five-point Likert-type scale: 1 (strongly disagree), 2 (disagree), 3 (undecided), 4 (agree), and 5 (strongly agree). A key to guide these ratings was provided under the instructions. Items 63 and 64 were the ones concerning methods, described earlier. Item 65 was the open-ended question described earlier.

Data were entered into an SPSS statistical database. Exploratory factor analysis (EFA) is an appropriate way to identify underlying patterns of data that correspond to theorised constructs when the instrument used to measure them is new or when such instruments have been modified [70,71]. Items from the OCPSQ were subjected to EFA using the SPSS software. The procedure for the earlier studies and the current study is described below.

Exploratory factor analysis was undertaken to ascertain the underlying data structure and to test the proposed constructs concerning aspects of organisational communication arising from the OCSPQ. Principal axis factoring was used as the initial extraction procedure because the procedure assumes that no emerging factors will be interrelated [70] and because of its reported effectiveness across different types of distributions [72]. This did not, however, yield a satisfactory solution. Due to the possibility of intercorrelated factors because of the likelihood, mentioned earlier, that different types of communication interactions may complement one another, the nonorthogonal oblimin procedure was used to clarify the underlying structures [72]. Initial factor analyses resulted in unsatisfactory solutions comprising some uninterpretable item clusters. The elimination of three items due to poor fit and low communalities led to the best solution [70]. These items were: “The principal sends out more information than staff can deal with”, “Staff members do not withhold personal information when talking socially”, and “Staff members have opportunities to meet and discuss issues”. The number of factors was determined using the Kaiser criterion of eigenvalues greater than 1.00, the Cattell criterion based on inspection of the scree graph, and general interpretability [70,72].

The EFA procedure for the first study yielded a ten-factor solution. Reliabilities of the factor clusters as scales representing communication constructs were satisfactory, with 7 of them achieving Cronbach alpha scores above 0.80., two above 0.60, and one at 0.45. The lower reliability score was due to low number of items, and the factor was retained because it was interpretable [70]. The ten emergent factors were broadly congruent with the theoretical constructs. In fact, the combination of 10 aspects of organisational communication identified in this analysis provided a simpler schema than the one theorised, due to there being fewer variables from multiple directions of flow. Only supportive communication emerged as distinct factors reflecting directions of flow. Openness and load emerged as vertical communication features (incorporating both upward and downward flows). A summary of this solution is reported in another article [68], but a detailed description of the factors that emerged is warranted here. The full factor solution, including reliability statistics, is provided in Appendix A.

Vertical openness of communication concerned the openness of communication between the principal and staff. Openness concerned the freedom of information flow, honesty, and low levels of distortion [38]. Openness from staff to the principal (upward openness) was accounted for by items such as “Staff at this school can approach the principal with bad news” and “Staff can approach the principal with personal information”. Openness from the principal to staff (downward openness) was accounted for by items such as “The principal gives staff ‘the whole story’ when discussing issues” and “The principal communicates openly to staff”.

Horizontal supportive communication comprised items about support giving among staff members. Horizontal support included general support, as indicated by the item “Staff members at this school support one another”, as well as sharing and approachability, as indicated by the item “Staff at this school can approach one another” (originally written to represent horizontal openness). The item “Staff members generally have opportunities to meet informally” was originally designed to



represent horizontal load, but made sense in this factor because supportive colleagues must logically be able to approach one another [31].

Directive communication concerned instruction given to the staff from the principal. Items such as “The principal tells staff how things are to be done” and “The principal often directs work” typified this factor. A third item “Information about this school’s goals and mission comes from the principal” (originally written for downward cultural communication) fitted well within this factor because goal and mission sharing may come about as a result of direction or vice versa [3].

Access to communication channels was the first unanticipated factor. It concerned opportunities for staff members to discuss work issues with the principal and colleagues via formal channels. Three of the items, typified by “Staff at this school have ample opportunities to see the principal about work issues”, were originally written to represent upward load. The other two, “Staff have opportunities to make positive remarks to the principal about his/her work” and “Staff members have ample opportunities to meet and discuss work issues with one another”, were written for upward openness and horizontal load, respectively, but made sense as part of this new factor.

Cultural communication comprised items such as “Staff members show new staff ‘the ropes’”, which had been written to represent horizontal cultural communication. The item “The principal supplies information about how things are done around here” was constructed to represent downward cultural communication. The factor makes sense as it deals with the sharing of cultural information among staff members in schools. It appears that this sample perceived cultural communication as a multidirectional aspect of school communication.

Vertical load of communication was so named because one item, “The principal gets more information than he/she can handle”, concerned upward load while the other, “The principal sends too many messages”, dealt with downward information load. It was the second unanticipated factor. It was strongly anticipated that upward and downward load would emerge as separate factors, given the items constructed. It was decided to retain this factor despite a relatively low alpha reliability of 0.45, as it was theoretically and conceptually interpretable. The relatively low alpha reliability coefficient may be partly explained by the small number of items [70].

Upward supportive communication comprised items about staff offering support to their principals. Two of the items, “Staff members give emotional support to the principal” and “Staff give moral support to the principal” were designed to represent the equivalent theoretical construct. The third item, “Staff are generally honest in their interactions with the principal” was originally written to represent upward openness, but it fitted logically within this factor because if staff members are giving support to the principal, they are likely to have a positive relationship, which is likely to include honesty.

Downward supportive communication comprised items reflecting the different ways a principal might communicate support to staff members. The items “The principal provides staff with positive feedback” and “The principal gets behind staff when they are doing things about which they are not confident” typified the “hands on” characteristic of this factor. Most of the items were written for the equivalent theoretical construct. One item, “The principal indicates that the opinions of staff are worthwhile”, was originally composed to represent the theoretical downward democratic communication, but made sense as a manifestation of downward supportiveness.

Adequacy of information was the other unanticipated factor. It concerned accuracy, sufficiency, and load of information, as indicated by “The information staff members send to the principal is usually accurate”, “Staff receive sufficient information from the principal to know how to do their jobs”, and “There is too much information from other staff”, respectively. The fourth item concerned reliability of information from colleagues which again related to accuracy. Information may be perceived as adequate if it is sufficient for what is needed, is accurate and is not too overwhelming. It was not quite in line with the original conception of adequacy as a dimension of load, but was interpretable as an aspect of organisational communication.

Democratic communication, though originally conceived as three directional aspects of organisational communication, emerged as a single aspect like cultural communication. This tenth

factor concerned staff participation in decision-making processes within their schools. The notions of teamwork and inclusiveness were evident in items such as “Staff are encouraged to work with one another to change or review aspects of the school’s organisation” and “The principle listens to suggestions from staff”. A more general notion of participation in decision-making was also illustrated by the item “Staff are able to influence the principal’s decisions”.

While these ten factors provided a reasonably interpretable and coherent model of aspects of organisational communication in primary schools and were used successfully for investigations of job attitudes [68], there were some issues that led to subsequent refinement of the OCPSQ. Vertical load of communication was not the representation of load originally theorised. While the bi-directionality of flow worked well for openness in terms of a description of interactions, it tended to obscure the potential impacts of communication overload as experienced by staff [70] and underload did not become apparent in any iteration of the analyses. Adequacy of information, while also interpretable, was really a combination of concepts and a clearer factor to do with adequacy, along the lines of the load continuum described earlier, was desired [63].

Refinements to the OCPSQ were undertaken in preparation for a second study. The three items eliminated from the final factor solution due to low communalities and poor fit were removed. Another item “Staff members have opportunities to meet and discuss issues” was also removed because its wording was regarded as similar to another representing the same construct. Two items were reworded due to potential misinterpretation. For example, an item that related to excessive directive communication received unusually high numbers of “3” scores on the Likert scale, suggesting a neither agree nor disagree (undecided) rating. It had been foreshadowed by respondents in the consultation group that the wording might reflect negative overtones towards principals, especially as the word “autocratic” was used. The responses might have been due to these issues. Therefore, the word “autocratic”, relating to principals’ directive behaviour, was replaced with “controlling”.

Eight new items were written to more effectively account for overload, adequacy and underload and replace “the principal is autocratic” for directive communication. It was intended that these new communication load items would contribute to the emergence of distinct individual factors representing each aspect of load. Literature was again consulted to operationalise the constructs [59,62]. Given these additions and the fact that most of the items comprising access to communication channels were originally written to represent facets of load, the possibility of this factor disappearing in favour of clearer factors relating to communication overload, adequacy, and underload was considered worth the risk. The new items are presented in Table 2 below. These changes resulted in a revised version of the OCPSQ comprising 66 items relating to aspects of communication. Items 67 and 68 were the method rating section and item 69, the open ended question.

**Table 2.** New items added for the second and current study.

Item	Construct
I do not get enough information about what is going on in this school	Underload
I do not receive information I need within a reasonable timeframe	Underload
I find it hard to get the information I need to do my job	Underload
I find it difficult to get the information I need to do my job	Underload
Information that I miss is passed on to me by my colleagues	Adequacy
All efforts are made to ensure staff know what is happening	Adequacy
I am overloaded with information	Overload
The principal is too controlling	Directive communication

The revised OCPSQ was used in a larger study of organisational communication in Catholic primary schools conducted in 62 schools across three Australian states and territories: New South Wales, Australian Capital Territory, and Queensland (n = 568). The sample comprised a similar gender distribution to the first study (female = 86.3%, male = 12.3%, unstated = 1.4%), and similar years of experience (<10 years = 42.4%, 10+ years = 56.4, unstated = 1.2%). Again, the majority of respondents

were classroom teachers (62.1%) and non-principal school executive members (19.4%), but there were slightly less non-teaching respondents (17.6%). As with the first study, the instrument was engaged as part of a study of relationships between organisational communication and job attitudes. A detailed report of this study has been provided in the earlier report by this author [65].

Given the modifications to the OCPSQ, exploratory factor analyses were again conducted, employing the same procedures for rotation, extraction, and factor determination used in the first study. Four items were omitted from the analyses due to low communalities and poor fit [70]. The new ten factor solution for organisational communication was stronger than that from the first study and variance explained was 61%. The structure made more sense conceptually and comprised representations of aspects of organisational communication that were easier to understand.

Reliabilities were stronger overall compared to those from the earlier study. The factors, along with number of items and Cronbach alpha reliabilities were: vertical openness of communication (7 items,  $\alpha = 0.91$ ), horizontal supportive communication (10 items,  $\alpha = 0.85$ ), directive communication (5 items,  $\alpha = 0.72$ ), access to communication channels (5 items,  $\alpha = 0.77$ ), cultural communication (5 items,  $\alpha = 0.77$ ), overload of communication (7 items,  $\alpha = 0.78$ ), downward supportive communication (6 items,  $\alpha = 0.88$ ), democratic communication (7 items,  $\alpha = 0.89$ ), upward supportive communication (4 items,  $\alpha = 0.78$ ), and adequacy of communication (6 items,  $\alpha = 0.81$ ).

The refinements to the OCPSQ resulted in a more interpretable factor structure for aspects of organisational communication. Some principal (as in largest) item loadings had moved from vertical openness of communication to other factors, but the loadings were sensible and resulted in factors that were even more effective representations of the theorised constructs. Eight of the original ten factors from study one emerged in study two. The two “new” factors were better representations of the respective theoretical constructs.

Overload of communication concerned too much information coming from colleagues and the principal, so vertical and horizontal directions of flow were again integrated. Items such as “I am overloaded with information”, one of the new items developed after the first study; “There is too much information from other staff”; and “The principal sends too many messages” typified this factor. This last item was loaded on adequacy of information in study one, but had clearly found its proper factor in study two.

Adequacy of communication appeared to “replace” adequacy of information in the second study. This similarly named, but altogether new factor was about staff members receiving adequate and timely information in order to do their jobs. It was illustrated by items such as “Information that I miss is passed on to me by colleagues”, another of the new items introduced to this version of the OCPSQ, and “Staff members receive enough information from one another”. This last item had loaded on horizontal supportive communication in study one, and had originally been written to represent horizontal load (adequacy), so its movement to adequacy of communication was a distinct improvement.

While adequacy and overload were clarified as distinct factors, underload did not emerge, even though new items had been written specifically to represent that theoretical construct. Two of those items loaded on the factor overload of communication, and were hence used in subsequent analyses relating to job attitudes in the larger study as reverse scored items. A third loaded on adequacy of communication, fitting well there as a reverse scored item. Another such item was omitted due to poor fit and low communality. Access to communication channels remained a distinct factor with virtually the same items across both studies. Clearly, this is a salient aspect of organisational communication that has not been dealt with much by previous research, but should be in future studies.

The refinements to the OCPSQ resulted in a more interpretable and reliable set of factors, which was impressive given that the sample was larger and drawn from a wider geographical area. Aspects of communication identified in the second study again related to functions of interactions (cultural, supportive, democratic, and directive) and features of communication (openness, load, and access to channels).

### 3.3. The Current Study

The version of the OCPSQ used in the second study was employed in a much larger, cross-sector investigation. This time government, Catholic and independent schools from all states and territories of Australia were invited to participate in a national study of communication and job attitudes in primary schools. A stratified random sampling procedure [66] was employed to ensure proportions of the sample were representative of the population according to the three sectors that operate in Australia (government, Catholic systemic, and independent). A total of 4082 questionnaires were distributed to staff members in 160 schools and 1575 useable ones (male = 13.2%, female = 85.8%, unstated = 1.0%) were returned (response rate = 39%). The years of experience of this sample were almost equal (<10 years = 48.8%, 10 + years = 50.3%, unstated = 0.9%), while most of the participants were classroom teachers (65.0%) or executive members (12.7%), and just over a fifth were non-teaching staff (21.5%).

Exploratory factor analyses were conducted because of the wider sampling, both in terms of geography and context [71], as well as the larger number of participants [72]. The maximum likelihood procedure was used for extraction due to reported advantage over principal axis factoring in larger samples [73]. Oblimin was again used as the method of rotation due to likely interrelationships between factors [70]. Confirmatory factor analyses were then conducted to test the hypothesised model emerging from the EFA process [74].

Confirmatory factor analysis (CFA) is an appropriate method for validating instruments and where previous use has established reasonably stable factor structures representing interpretable theoretical constructs [71,72]. Given the large number of items comprising the OCPSQ, a two-stage approach was used to conduct these analyses using AMOS structural equation modelling software. In Stage 1, items that loaded on factors from EFA were linked to a latent variable representing that factor, starting with vertical openness and repeated for each individual factor. The maximum likelihood procedure was used in estimation of all models.

Goodness of fit indices were examined and post hoc analyses involving regression weightings, error correlations, and indicators for modification were undertaken as tests of applicability to the given sample [74]. In this way any problems with fit or error could be identified early and the addressing of problems conducted more easily [75]. Stage 2 involved the combination of all individual factor structures into a single structure of aspects of organisational communication incorporating all ten factors. This constituted the hypothesised model. Again, maximum likelihood estimation and examination of the fit indices, followed by post hoc analysis, were conducted to test the appropriateness of the model. The hypothesised model is presented in Figure 2 below.

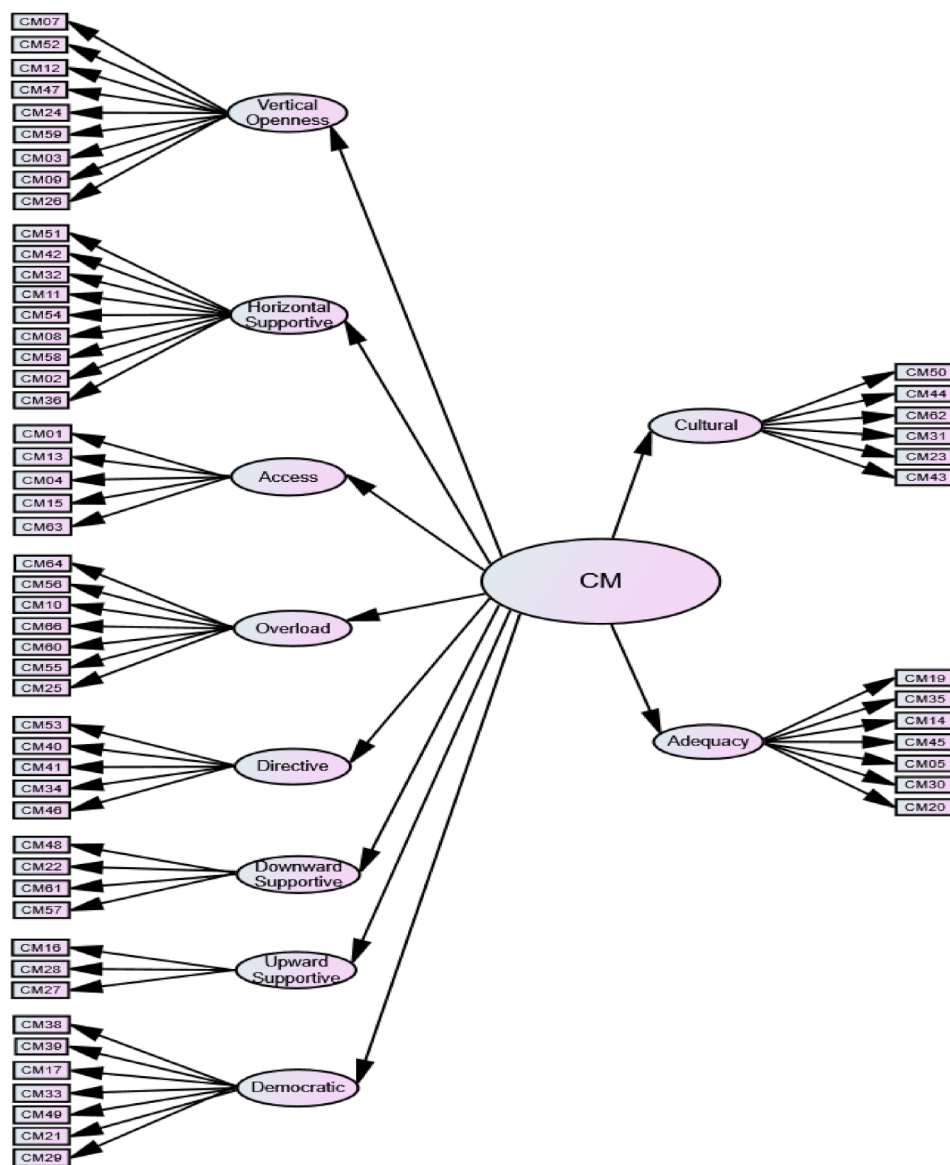


Figure 2. The hypothesised model of organisational communication in primary schools.

#### 4. Results and Discussion

The results are presented in three sections. The first section describes the factor solution emerging from the exploratory factor analyses. The second section reports on the results of Stage 1 of the confirmatory factor analysis, which involved estimation of each latent variable representing communication constructs, sometimes referred to as measurement models [74]. The third section reports on the confirmatory analysis for the whole model with all latent variables brought together. Rather than having a separate section, discussion of the results is included in these sections for clarity and coherence, given the focus needed on explanation of findings at the points where they were described and how specific results influenced subsequent analyses during EFA and CFA procedures.

##### 4.1. Exploratory Factor Analysis

The result, after omission of four items due to low communalities, large cross-loadings, and poor fit, was a ten-factor solution that explained 60% of the variance. The factors to emerge were similar to those from the earlier second study, but reliabilities were generally higher for factors in this solution. The omitted items were “Staff members at this school share personal information”, “Information about



this school's goals and mission comes from the principal", "The information staff members send to the principal is usually accurate", and "I find it difficult to get the information I need to do my job".

The factors generally comprised the same items, but factor names for features of communication were shortened to make later analyses in SPSS and AMOS less cumbersome [70]. Some minor movements of items among variables were noted, but those loadings were considered more sensible in this iteration. For example, vertical openness gained the item "The principal is warm and considerate", which had loaded on downward supportive communication in study two, but made sense as a facet of openness here [9,38]. The item "Staff at this school can approach the principal with bad news" had loaded (weakly) on upward supportive communication in study two, but is perfectly aligned to openness, where it loaded for this study (the item was originally written for theoretical construct "upward openness"). Item "The principal is actively involved in the induction of new staff", originally written to represent theoretical construct "downward cultural communication" moved from downward supportive communication in study two, to where it fitted best, cultural communication. This explains why the number of items loaded on downward supportive communication reduced from 6 to 4, and why cultural communication gained an item. As a result of losing an item due to omission but gaining another, access became exclusively about opportunities to discuss work and other issues with the principal. The results are presented in Table 3 below. The full factor solution, with item loadings for each factor, is presented in Appendix B.

**Table 3.** Factor solution for the current study.

Factor Name	Number of Items	Mean	SD	Eigenvalue	Reliability (Alpha)
Vertical openness	9	3.91	0.70	32.83	0.92
Horizontal supportive communication	9	4.01	0.52	8.08	0.86
Access	5	3.84	0.74	3.71	0.82
Overload	7	2.25	0.64	3.22	0.78
Directive communication	5	3.74	0.58	2.46	0.73
Downward supportive communication	4	3.87	0.77	2.32	0.87
Upward supportive communication	3	3.65	0.71	2.20	0.76
Democratic communication	7	3.85	0.67	2.00	0.89
Cultural communication	6	3.67	0.64	1.75	0.79
Adequacy	7	3.77	0.63	1.62	0.82

n = 1575 KMO = 0.968.

In sum, the factor structure improved on earlier studies, but aspects of communication remained relatively stable, and better reliabilities were achieved in the current study despite differing samples. This, and that fact that sampling adequacy (KMO statistics) remained high, suggested that confirmatory factor analyses could now be used to validate the OCPSQ. These more rigorous analyses would also be used to test the hypothesised model of organisational communication in primary schools comprising the ten factors identified in the most recent EFA. Accordingly, confirmatory factor analyses were conducted on the data using AMOS software. Prior to this work, the issue of missing data needed to be addressed. After cases with missing data were removed, a sample of 1209 remained and was used for the CFA procedures described below.

#### 4.2. Confirmatory Factor Analysis—Stage 1

Evaluation of each factor commenced with inspection of the estimates, including regression weights related to each of the items linked to each latent variable, standard error figures, and significance, as these would be first indicators of any misspecification [74]. This was followed by reference to the Chi-square statistic ( $\chi^2$ ) and, more importantly, the Chi-square by degrees of freedom ratio ( $\chi^2/df$ ), which accounts for sample size (unlike  $\chi^2$ ) to obtain a first impression of the overall fit. This was followed by examination of the goodness of fit index (GFI) and adjusted goodness of fit index (AGFI) as initial, global estimates of how well the factor specified for the model fitted the sample data

generally. Values over 0.90 suggest adequate fit, but, as these indices have been reported to be influenced too heavily by sample size [74], two incremental fit indices were used to assess the models. The Tucker–Lewis index (TLI, also referred to as the non-normed fit index or NNFI) and the comparative fit index (CFI) have been recommended for their robustness as well as their accounting for sample size [76] and model complexity [77]. While TLI and CFI figures over 0.90 have been recommended [74], other scholars suggest that 0.95 or above should be considered a better indicator of fit [76,77].

The standardised root mean square residual (SRMR) and the root mean square error of approximation (RMSEA) are not calculated the same way as the other fit measures, being based on residuals. The SRMR has been reported as sensitive to sample size and figures below 0.05 are considered indicative of adequate fit. The RMSEA is not sensitive to sample size and indices between 0.06 and 0.08 are regarded as adequate to mediocre. For both of these indices it is suggested that the closer the figure is to zero the better the fit [74,76].

In all cases, the first attempts at establishing fit were problematic with  $\chi^2/df$  statistics in the high range (above 3.00 according to Hoe [78] and Schreiber et al. [76]) and RMSEA readings either above 0.100 or at the higher end of the 0.06–0.08 range suggested by Schreiber et al. [76]. Modification indices and inspection of the standardised residuals [74] suggested slight adjustments could improve fit. Model fit was improved by correlating error terms as suggested by Hooper et al. [75] and others [79]. In all cases these adjustments made theoretical sense due to the wording of items and how they represented different facets of the construct represented by the factor [70]. For example, for vertical openness, two such items concerned (respectively) how honest and how open the principle is to staff. It is quite feasible for honesty and openness to measure similarly given their established links in the literature [31]. This is illustrated in Figure 3 below.

The need for these adjustments resulted in the comparison of the “initial” model with the later models, the “final” one being that with the most optimal GFI, AGFI, TLI, and CFI readings; lowest SRMR and RMSEA statistics; and, also importantly, explainable error correlations. A summary of the results of the first stage is presented in Table 4. In most cases the final model produced better indices of fit. Figures for upward supportive communication, while improved, were still problematic (high  $\chi^2/df$  and RMSEA readings), but this probably reflected the low number of items with resultant low degrees of freedom [70], while other indicators suggested adequate fit. It was anticipated that by establishing best fits in this stage, testing of the full model of organisational communication with all factors combined (the hypothesised model) would be easier.

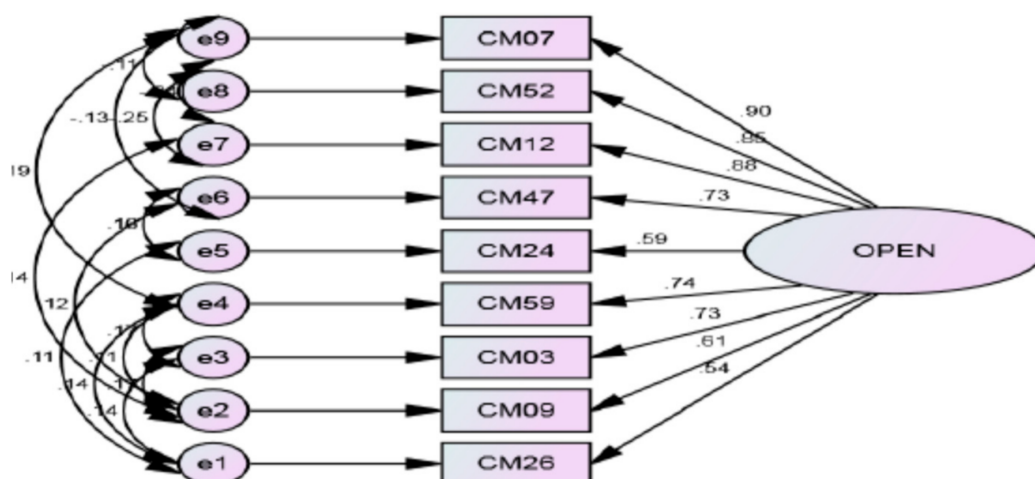


Figure 3. Final model for vertical openness showing correlated error terms.

**Table 4.** Results of confirmatory factor analysis (CFA) Stage 1.

Factor	Loading Range	$\chi^2/df$	GFI	AGFI	TLI	CFI	SRMR	RMSEA (LO90, HI90)
Vertical openness								
Initial model	0.58–0.88	80.127	0.961	0.935	0.960	0.970	0.023	0.077 (0.068, 0.086)
Final model	0.54–0.90	20.573	0.994	0.969	0.991	0.997	0.009	0.036 (0.021, 0.051)
Horizontal supportive								
Initial model	0.30–0.74	60.409	0.968	0.946	0.955	0.966	0.019	0.067 (0.058, 0.077)
Final model	0.28–0.89	30.717	0.986	0.969	0.977	0.987	0.011	0.047 (0.036, 0.059)
Access								
Initial model	0.56–0.89	50.892	0.990	0.971	0.979	0.989	0.021	0.064 (0.045, 0.087)
Final model	0.55–0.90	30.184	0.997	0.984	0.991	0.997	0.010	0.043 (0.014, 0.074)
Overload								
Initial model	0.41–0.73	170.436	0.943	0.887	0.827	0.885	0.055	0.117 (0.104, 0.130)
Final model	0.38–0.69	10.243	0.995	0.985	0.987	0.994	0.017	0.031 (0.013, 0.049)
Directive								
Initial model	0.28–0.80	40.747	0.937	0.811	0.732	0.866	0.066	0.181 (0.161, 0.203)
Final model	0.21–0.84	20.645	0.999	0.987	0.989	0.999	0.005	0.037 (0.000, 0.094)
Downward supportive								
Initial model	0.64–0.87	290.563	0.976	0.878	0.935	0.978	0.022	0.154 (0.121, 0.189)
Final model	0.60–0.89	40.635	0.998	0.981	0.992	0.999	0.006	0.055 (0.013, 0.109)
Upward supportive								
Initial model	0.56–0.88	210.611	0.988	0.930	0.941	0.980	0.037	0.131 (0.086, 0.181)
Final model	0.74–0.79	140.950	0.992	0.951	0.960	0.987	0.043	0.107 (0.064, 0.159)
Democratic								
Initial model	0.55–0.88	140.125	0.954	0.907	0.944	0.963	0.026	0.104 (0.092, 0.117)
Final model	0.55–0.86	20.490	0.994	0.984	0.994	0.997	0.009	0.035 (0.019, 0.052)
Cultural								
Initial model	0.43–0.83	180.607	0.955	0.894	0.874	0.925	0.042	0.121 (0.105, 0.137)
Final model	0.39–0.85	20.269	0.998	0.987	0.991	0.998	0.011	0.032 (0.000, 0.052)
Adequacy								
Initial model	0.46–0.77	290.120	0.903	0.807	0.850	0.854	0.059	0.153 (0.140, 0.166)
Final model	0.35–0.81	30.214	0.993	0.979	0.989	0.993	0.016	0.043 (0.026, 0.061)

n = 1209,  $p \leq 0.001$ . Loading range = range of loadings of items on factor,  $\chi^2/df$  = Chi-square to degrees of freedom ratio, GFI = goodness of fit index, AGFI = adjusted goodness of fit index, TLI = Tucker–Lewis Index, CFI = comparative fit index, SRMR = standardised root mean square residual, RMSEA = root mean square error of approximation, (LO90, HI90) = low and high end confidence interval.

### 4.3. Confirmatory Factor Analysis—Stage 2

The full, hypothesised, model of organisational communication was brought together using the results from Stage 1. Rather than test a one factor model or alternative model which, given the results of EFA, as well as the number of hypothesised factors, would be redundant, the hypothesised model was assessed as a first model without additional covariances added and an assumption of no correlation between factors. This was compared to subsequent models resulting from anticipated modifications [76]. The ten factors were linked to a latent variable representing the total variance of organisational communication so that the contributions of each factor to the overall model (estimated as regressions) could be assessed. Evaluation of fit employed the same set of indices used in Stage 1, with the addition of the Hoelter Critical N (Hoelter CN) to check the suitability of sample size for the model [74].

The results of three models are presented here. Model 1 was the hypothesised model; Model 3, the final model, was the result of item deletions; and Model 2 was an intermediate model resulting from minor modifications prior to the removal of items. These data are presented in Table 5. The estimated loadings of the ten factors on to organisational communication are presented for Models 1 and 3 in Table 6.

**Table 5.** Comparison of models from Stage 2.

Model	$\chi^2$ ( $\chi^2/df$ )	GFI	AGFI	TLI	CFI	SRMR	RMSEA (HI90, LO90)	Hoelter 0.05, 0.01
Model 1	78780.692 (40.436)	0.802	0.782	0.848	0.857	0.066	0.053 (0.052, 0.055)	288, 295
Model 2	49540.615 (20.852)	0.878	0.863	0.889	0.918	0.036	0.039 (0.038, 0.040)	448, 458
Model 3	2200.262 (20.687)	0.922	0.909	0.946	0.951	0.030	0.037 (0.035, 0.039)	490, 503

n = 1209,  $p \leq 0.001$ .**Table 6.** Factor loadings for Models 1 and 3.

Factor	Model 1	Model 3
Vertical openness	0.97	0.96
Horizontal supportive	0.45	0.38
Access	0.84	0.73
Overload	−0.74	−0.52
Directive	0.85	0.78
Downward supportive	0.89	0.90
Upward supportive	0.74	0.64
Democratic	0.92	0.91
Cultural	0.50	0.39
Adequacy	0.83	0.73

n = 1209,  $p \leq 0.001$ .

The results for Model 1 suggested a less than adequate fit. While SRMR and RMSEA indices were acceptable, the absolute (GFI, AGFI) and incremental (TLI, CFI) indices suggested that improvement was needed. As with Stage 1, inspection of the modification indices with standardised residuals suggested that error terms should be correlated. In line with recommendations by Byrne and Hooper et al. [74,75], only those that made sense theoretically were specified for correlation.

The most prominent modification indices related to associations between factors. Intercorrelation among these was expected and nine were identified and specified for the model. Horizontal supportive was associated with cultural ( $r = 0.65$ ), adequacy ( $r = 0.44$ ), upward supportive ( $r = 0.21$ ), and directive ( $r = 0.24$ ). Due to the fact that considerable sharing of information, including cultural notions, can occur horizontally among staff, the first two correlations made sense [62,64]. The link with upward supportive may reflect a culture of support in schools, promoting vertical flows of this type of interaction. The association with directive could be the result of staff members helping one another to understand or implement directives from the principal, but the association was weak. cultural was associated with adequacy ( $r = 0.48$ ), directive ( $r = 0.40$ ), upward supportive ( $r = 0.22$ ), and access ( $r = 0.13$ ). It is possible to conceive principals imparting cultural information while also giving direction, and upward support giving might reflect reciprocation of appreciation for help. The links with adequacy and access are most probably a by-product of information sharing. The correlation between adequacy and directive ( $r = 0.63$ ) makes sense as in primary schools, because of the flatter structure, information about work will likely come from the principal. Similar associations have been identified in non-school contexts between managers and employees [62].

Correlations between error terms of items were then considered. Those yielding small effects (below 0.10) were not included in the final model. Many made logical sense. For example, error terms for items CM59 and CM61 (e6, e38) were allowed to be correlated ( $r = 0.38$ ) because both items, while clearly about different aspects of communication (vertical openness and downward supportive), related to positive behaviour of principals (showing warmth and consideration and being encouraging). As another example, error terms for CM48 (downward supportive) and CM49 (democratic) (e36, e47) were correlated ( $r = 0.28$ ) as, while both were representative of their relevant factors, they shared in

common instances when principals reach out to staff in a positive manner. Another example was the linkage of error terms for CM64 (overload) and CM40 (directive) (e24, e32). While both represented their respective factors well, both items referred to the frequency of principal communication, hence the significant, but weak, correlation ( $r = 0.19$ ). Likewise, error terms for CM08 (horizontal supportive) and CM22 (downward supportive) (e15, e37) were allowed to be correlated ( $r = 0.15$ ) as both items referred to support giving.

In addition to these adjustments, a number of cross-loadings were identified. For example, CM66, concerning too many messages from colleagues and part of overload, appeared also to contribute to horizontal supportive (loading =  $-0.19$ ). The association made sense, however, as one could easily conceive too much information from other staff being a by-product of horizontal communication but also contributing to perceived load. The negative association, of course, indicates that this scenario is an unpleasant aspect of communication that may erode feelings of support. In a similar vein, the link between CM58, concerning the reliability of information coming from colleagues, and overload (loading =  $-0.17$ ) alludes to the possibility of such information contributing to perceptions of communication overload. A cross-loading, between CM57 (downward supportive) and cultural was also explainable (loading =  $0.10$ ). The item refers to times when principals get behind staff who are lacking confidence, which could extend to school culture, either because such behaviour is part of the culture or the thing they are not confident in has to do with school policy. Another cross-loading ( $0.35$ ), between CM05 (adequacy, concerning information passed on by colleagues) and cultural (loading =  $0.35$ ) is understandable because the information staff members pass on to colleagues may relate to cultural matters.

These error correlations and cross-loadings might be viewed by some as signs of a poor conceptual base or flawed item design [70,72]. However, they might also point to the specific experiences of the sample [74] and it is worth remembering that organisational communication can be complicated by the potential for messages to serve more than one function [26] and for different aspects to act in complementary ways [25]. Therefore, it may have been naive to expect a more “clean-cut” model of organisational communication to emerge.

More than twenty error correlations and twelve cross-loadings were added to the model incrementally. While adding the specifications detailed above improved fit somewhat, with SRMR and RMSEA indices well below 0.05, the GFI, AGFI, TLI, and CFI readings were below the suggested cut-offs of 0.90 and 0.95. Attention was then turned to the loadings of items as recommended by Byrne [74]. Inspection of items that shared error correlations and cross-loadings revealed several to have the lowest loadings on their factors and reference back to the results of EFA revealed that these items had small to moderate cross-loadings (between 0.20 and 0.30) on more than one factor. These issues have been identified as bases for item removal in previous research [80]. Removal of 19 items, starting with those that had lowest loadings in Model 2, led to dramatic improvement in model fit, and eventually to the final Model 3 (see Table 6). The removals also resulted in less error correlations and only four cross-loadings (those described earlier). The loadings of the ten factors on to organisational communication were influenced by these modifications to varying degrees as, shown in Table 5, but these variations were of no great concern. The final model (Model 3) including estimates is presented in Figure 4. For greater clarity, Table 7 lists the standardised regression weights of each item to their factors in Figure 4. Table 8 presents the standardised regression weights of the cross-loaded items shown in the model, and Table 9 lists the error correlations in the model.

The deletion of a number of items, while a concern during model specification, does not point to a poorly designed instrument, but could reflect the difficulty of achieving good fit with large numbers of items [70] as well as particular issues relating to the sample [71,74]. Given this reasoning and in line with suggestions from other research of this type [76,80,81], it is recommended that the OCPSQ is used in its entirety in future studies.

Given the number of additional specifications made in Stages 1 and 2 of the CFA process, it may be argued that the analysis moved back into an EFA mode [70,74]. However, this is not unusual [71] or



necessarily problematic. Harbaugh and Thompson have asserted that “there are ‘exploratory’ elements that seep into CFA” [80] (p. 2). There is no shortage of studies requiring, for example, inclusion of error correlations [79,81]. Marsh et al. went further, referring to the often unavoidable processes of re-specification in CFA as “exploratory structural equation modelling” [81]. Due to differences between samples and potential for understandings of theorised constructs to change over time, some form of exploratory work is likely to be required for any instrument that attempts to measure the phenomena that people experience in organisations [71,81].

The ten-factor model of aspects of organisational communication in primary schools appeared to be validated by relative stability across three samples over time and the results of CFA. The theoretical functions of communication were all supported, but only supportive communication emerged as separate, directional aspects of communication. The theoretical features of communication were largely supported, with load and openness emerging as factors across studies. Underload did not emerge as a factor in any of the studies, but the unanticipated concept of access to channels was a useful addition to the model. The revised conceptual model is outlined in Figure 5 below.

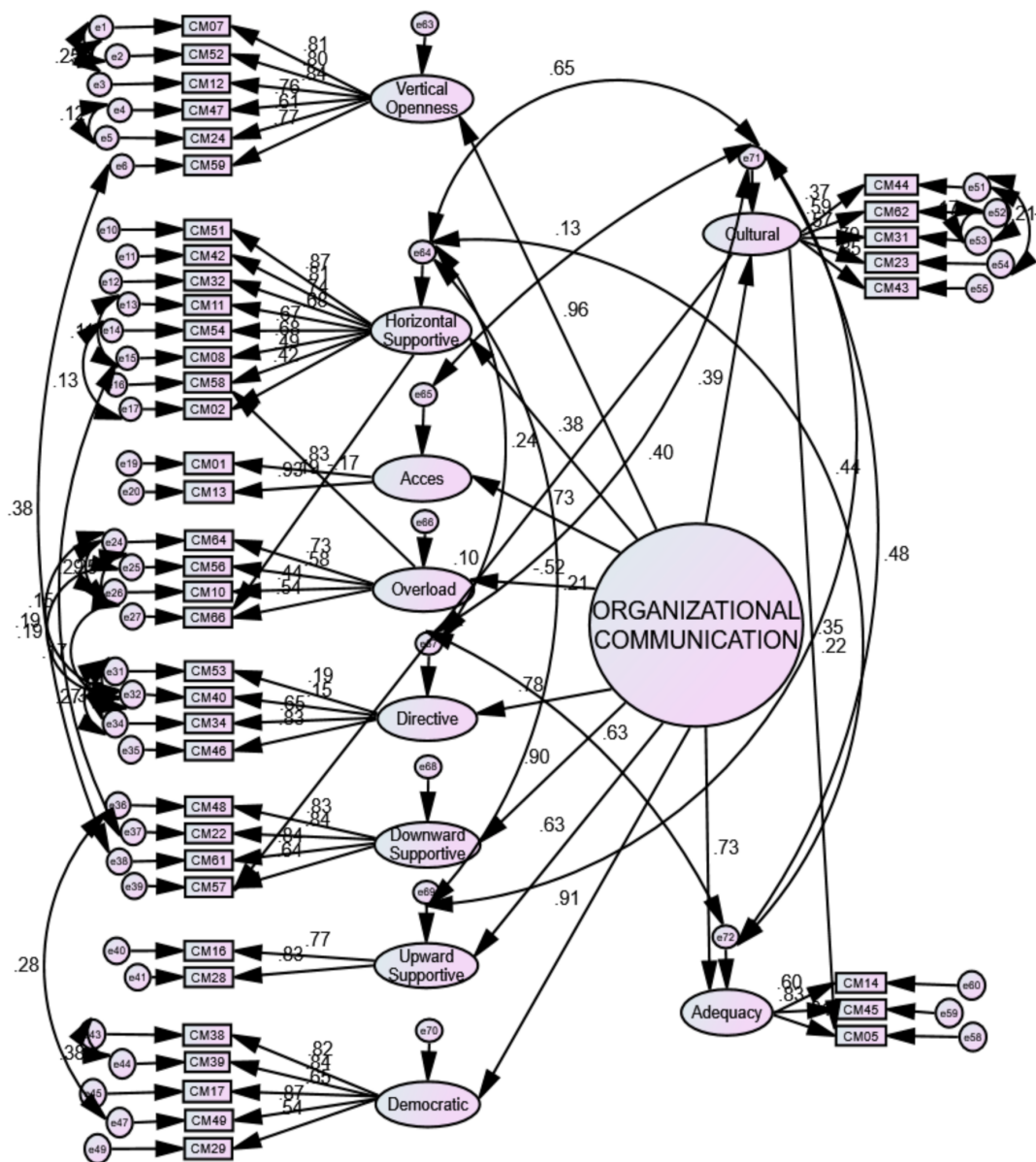


Figure 4. Final model of organisational communication in primary schools.

**Table 7.** Item—factor standardised regression weights in the final model.

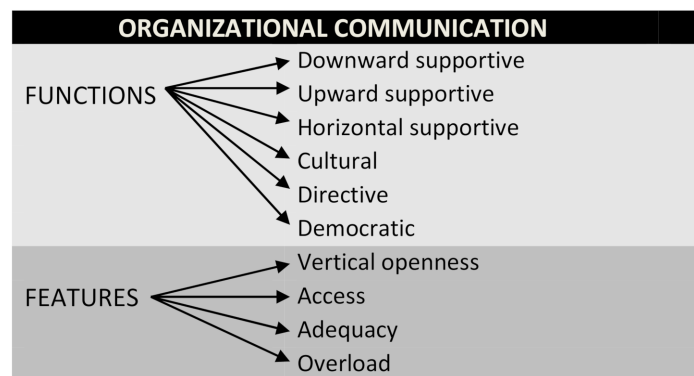
Regression			Estimate
CM01	<—	Acces	0.83
CM13	<—	Acces	0.93
CM10	<—	Overload	0.44
CM56	<—	Overload	0.58
CM64	<—	Overload	0.73
CM66	<—	Overload	0.54
CM40	<—	Directive	0.15
CM34	<—	Directive	0.65
CM46	<—	Directive	0.83
CM53	<—	Directive	0.19
CM22	<—	Downward_Supportive	0.84
CM61	<—	Downward_Supportive	0.84
CM57	<—	Downward_Supportive	0.64
CM48	<—	Downward_Supportive	0.83
CM16	<—	Upward_Supportive	0.77
CM28	<—	Upward_Supportive	0.83
CM17	<—	Democratic	0.65
CM49	<—	Democratic	0.87
CM29	<—	Democratic	0.54
CM39	<—	Democratic	0.84
CM38	<—	Democratic	0.82
CM59	<—	Vertical_Openness	0.77
CM47	<—	Vertical_Openness	0.76
CM12	<—	Vertical_Openness	0.84
CM52	<—	Vertical_Openness	0.80
CM07	<—	Vertical_Openness	0.81
CM24	<—	Vertical_Openness	0.61
CM08	<—	Horizontal_Supportive	0.68
CM58	<—	Horizontal_Supportive	0.49
CM02	<—	Horizontal_Supportive	0.42
CM11	<—	Horizontal_Supportive	0.68
CM32	<—	Horizontal_Supportive	0.74
CM42	<—	Horizontal_Supportive	0.81
CM54	<—	Horizontal_Supportive	0.67
CM51	<—	Horizontal_Supportive	0.87
CM31	<—	Cultural	0.57
CM23	<—	Cultural	0.79
CM43	<—	Cultural	0.85
CM62	<—	Cultural	0.59
CM44	<—	Cultural	0.37
CM14	<—	Adequacy	0.60
CM45	<—	Adequacy	0.83
CM05	<—	Adequacy	0.31

**Table 8.** Cross-loaded items in the final model.

Regression			Estimate
CM58	<—	Overload	−0.17
CM05	<—	Cultural	0.35
CM66	<—	Horizontal_Supportive	−0.19
CM57	<—	Cultural	0.10

**Table 9.** Error correlations in the final model.

EC		Estimate	
e64	<->	e71	0.65
e71	<->	e72	0.48
e64	<->	e72	0.44
e67	<->	e71	0.40
e67	<->	e72	0.63
e64	<->	e69	0.21
e64	<->	e67	0.24
e69	<->	e71	0.22
e65	<->	e71	0.13
e5	<->	e4	0.12
e2	<->	e1	0.25
e3	<->	e1	0.33
e17	<->	e14	0.13
e15	<->	e13	0.11
e26	<->	e24	0.29
e26	<->	e25	0.25
e32	<->	e31	0.36
e34	<->	e31	0.27
e34	<->	e32	0.13
e44	<->	e43	0.38
e51	<->	e54	-0.14
e51	<->	e53	0.21
e52	<->	e53	0.18
e6	<->	e38	0.38
e25	<->	e32	0.19
e26	<->	e32	0.17
e24	<->	e32	0.19
e36	<->	e47	0.28
e15	<->	e37	0.15



**Figure 5.** Revised conceptual model of organisational communication in primary schools.

### 5. Conclusions

This article described the development and refinement of an instrument to measure functions and features of organisational communication in primary schools. The OCPSQ has emerged as a reliable instrument to measure a comprehensive range of aspects of organisational communication in primary schools. Ten aspects of organisational communication in primary schools were identified. Six of these related to functions of communication, which included downward, upward, and horizontal supportive communication, as well as cultural, directive, and democratic communication. The four features of communication related to vertical openness, access, adequacy, and load.

### 5.1. Limitations

The current study is not without limitations, which relate to sample size as well as applicability to other contexts. The study reported here comprises a small sample, less than 1%, when compared to the total population of primary staff in Australian schools [69]. The current study sought to mitigate this issue by sampling from government and nongovernment schools across all the states and territories. Nevertheless, it would be valuable to know how the results of replication studies conducted with different samples from Australia, and indeed other countries, would compare to those reported here. Further research is warranted in relation to the applications of the OCPSQ as a measure or aspects of communication in these contexts.

### 5.2. Implications for Educational Systems and Future Research

The OCPSQ can be used to measure the extent to which certain types of communication occur. Scales derived from the factors could be used to measure these aspects to benefit schools in relation to effectiveness of communication and professional development [25,34]. For example, principals and leadership teams could survey their staff to identify areas that could be optimised, such as supportive communication, or minimised, such as overload, or whether staff members feel communication is suitable for their needs in terms of access to channels and information adequacy.

Several aspects of communication, such as supportiveness and level of openness point to organisational climate [31]. Therefore, the OCPSQ could be used as part of school review, development, and improvement processes where climate is of interest. The reported associations of organisational communication with job attitudes, such as job satisfaction [8,11,52] job stress [10,42,58], and intention to leave [49,61,62] mean that the instrument could be used to identify factors contributing to morale among staff as part of such reviews, thereby providing useful tools to optimise or improve staff productivity and school effectiveness. The aspects of communication identified in the ten factor model may be utilised as the bases of employment criteria for school leaders, not just principals, but those who seek middle leadership positions in schools [51,53]. Teachers aspiring to become leaders could possibly use the model as a guide to evaluate and develop their own interpersonal communication capabilities.

In addition, the OCPSQ could be adapted for secondary schools with items that, while still representing aspects of communication, reflect their tendency to be more hierarchical and segmented [15]. Scales derived from a secondary or primary school-oriented questionnaire could be used by wider school systems to monitor organisational communication across jurisdictions. Further, the adaptation of the OCPSQ to investigate communication in other educational organisations, such as universities, or organisations in completely different contexts, such as banks or large legal firms, are possibilities for future applications of the instrument. Beyond primary schools, adaptations of the instrument could also be used as a tool to aid organisational development and improvement in relation to efficiency, productivity, climate, and morale.

These suggested applications of the OCPSQ also point to possibilities for future research. Given the associations with school climate alluded to above, there is an obvious need to explore how the different aspects of communication, especially openness, adequacy, and supportive communication influence (or are influenced by) different school climates in empirical studies [30,31]. Given that several of the aspects of communication reported here relate to school leadership, there is scope for leadership communication to be explored in future studies, especially as associations between these variables and certain types of leadership, such as transformational and instructional [31], have not been addressed in school leadership research to date.

Finally, as suggested above, the instrument could be adapted for secondary school contexts. Given secondary schools tend to be more hierarchical in structure than primary schools [15] the tantalising possibility of an organisational communication in secondary schools questionnaire (with additional items to account for communication between staff and heads of department, for example) would shed more light on how communication works among staff in these contexts as well as test the model described here in this type of organisation. Research utilising a form of the

OCPSQ adapted for other organisations would potentially contribute to theory building in the wider fields of organisational and interpersonal communication.

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## Appendix A

**Table A1.** Factor solution from the first study.

	Factor/Item/(Reliability Coefficient)	Loading
	<i>Factor 1: Vertical openness of communication (<math>\alpha = 00.95</math>)</i>	
52	The principal is truthful	0.83
07	The principal communicates honestly to staff	0.80
12	The principal communicates openly to staff	0.80
03	The principal is willing to listen to staff	0.75
15	Staff can approach the principal with personal information	0.74
59	The principal is warm and considerate	0.72
26	Staff at this school can approach the principal with bad news	0.67
30	Staff members receive enough information from the principal to know what is going on	0.63
47	The principal gives staff "the whole story" when discussing issues	0.63
09	Staff receive messages from the principal at appropriate times	0.59
24	The principal reveals his/her true feelings about issues	0.59
41	The principal gives information that helps staff to carry out their roles	0.58
50	The principal is actively involved in the induction of new staff	0.50
	<i>Factor 2: Horizontal supportive communication (<math>\alpha = 00.89</math>)</i>	
51	Staff members at this school support one another	0.75
32	Staff at this school can approach one another	0.74
06	Staff members at this school share personal information	0.72
54	The staff at this school talk to one another when they have a problem	0.70
08	Staff tend to give supportive comments or feedback to other staff members	0.69
11	As a staff we help each other to get through the day	0.66
42	The staff at this school make each other feel they are part of a team	0.63
19	Staff members generally have opportunities to meet informally	0.57
02	Staff members express feelings about work issues to one another	0.51
20	Staff members receive enough information from one another	0.49
	<i>Factor 3: Directive communication (<math>\alpha = 00.61</math>)</i>	
53	The principal tells staff how things are to be done	0.70
40	The principal often directs work	0.61
18	Information about this school's goals and mission comes from the principal	0.46
	<i>Factor 4: Access to communication channels (<math>\alpha = 00.84</math>)</i>	
13	Staff at this school have ample opportunities to see the principal about work issues	0.83
01	There are adequate times to talk to the principal about work issues	0.81
04	Staff have opportunities to make positive remarks to the principal about his/her work	0.60
05	The principal sets times when staff can meet with him/her to discuss things without interruptions	0.59
35	Staff members have ample opportunities to meet and discuss work issues with one another	0.55
	<i>Factor 5: Cultural communication (<math>\alpha = 00.81</math>)</i>	
43	Staff members show new staff "the ropes"	0.79
31	Staff members inform new staff about the school's past achievements	0.76
62	Staff members inform new staff about the school's mission	0.72
23	Staff members give new employees information about how things should be done at this school	0.67
44	Staff members tell new staff stories about people or past events in the school	0.50
34	The principal supplies information about how things are done around here	0.36
	<i>Factor 6: Vertical load of communication (<math>\alpha = 00.45</math>)</i>	
14	The principal gets more information than he/she can handle	0.55
45	The principal sends too many messages	0.44
	<i>Factor 7: Upward supportive communication (<math>\alpha = 00.85</math>)</i>	
28	Staff give moral support to the principal	0.91
16	Staff members give emotional support to the principal	0.78
27	Staff are generally honest in their interactions with the principal	0.66



Table A1. Cont.

	Factor/Item/(Reliability Coefficient)	Loading
	<b>Factor 8: Downward supportive communication (<math>\alpha = 00.94</math>)</b>	
61	The principal is encouraging	0.91
48	The principal compliments staff	0.88
22	The principal provides staff with positive feedback	0.84
49	The principal indicates staff input in decision making is valuable	0.77
33	The principal indicates that the opinions of staff are worthwhile	0.72
57	The principal gets behind staff when they are doing things about which they are not confident	0.64
	<b>Factor 9: Adequacy of information (<math>\alpha = 00.63</math>)</b>	
46	Staff receive sufficient information from the principal to know how to do their jobs	0.55
58	Information that comes from other staff members is reliable	0.52
37	The information staff members send to the principal is usually accurate	0.45
* 60	There is too much information from other staff	0.37
	<b>Factor 10: Democratic communication (<math>\alpha = 00.85</math>)</b>	
38	The principal allows staff to contribute their thoughts on issues	0.77
17	The principal asks for input from staff on policy issues	0.75
39	The principal listens to suggestions from staff	0.74
21	Staff are encouraged to work with one another to change or review aspects of the school's organisation	0.66
25	There are times when staff can speak to the principal	0.59
29	Staff are able to influence the principal's decisions	0.49
* 55	The principal is autocratic	0.42

\* Reverse scored item.

## Appendix B

Table A2. Factor solution of the current study showing loadings of each item.

No.	Item Wording	Loading
<b>F1</b>	<b>Vertical openness</b>	
CM07	The principal communicates honestly to staff	0.83
CM52	The principal is truthful	0.73
CM12	The principal communicates openly to staff	0.72
CM47	The principal gives staff "the whole story" when discussing issues	0.47
CM24	The principal reveals his/her true feelings about issues	0.44
CM59	The principal is warm and considerate	0.39
CM03	The principal is willing to listen to staff	0.33
CM09	Staff receive messages from the principal at appropriate times	0.29
CM26	Staff at this school can approach the principal with bad news	0.18
<b>F2</b>	<b>Horizontal supportive communication</b>	
CM51	Staff members at this school support one another	0.88
CM42	The staff at this school make each other feel that they are part of a team	0.76
CM32	Staff at this school can approach one another	0.69
CM11	As a staff we help each other to get through the day	0.67
CM54	The staff at this school talk to one another when they have a problem	0.66
CM08	Staff tend to give supportive comments or feedback to other staff members	0.61
CM58	Information that comes from other staff members is reliable	0.42
CM02	Staff members express feelings about work issues to one another	0.39
CM36	Staff members do not withhold personal information when talking socially	0.19
<b>F3</b>	<b>Access</b>	
CM01	There are adequate times to talk to the principal about work issues	0.89
CM13	Staff at this school have ample opportunities to see the principal about work issues	0.78
CM04	Staff have opportunities to make positive remarks to the principal about his/her work	0.54
CM15	Staff can approach the principal with personal information	0.28
CM63	The principal sets times when staff can meet with him/her to discuss things without interruptions	0.25
<b>F4</b>	<b>Overload</b>	
CM64	The principal sends too many messages	0.63
CM56	I am overloaded with information	0.62
CM10	The principal sends out more information than staff can deal with	0.56
CM66	There is too much information from other staff	0.49
CM60	I do not receive information I need within a reasonable time frame	0.43
CM55	The principal is too controlling	0.41
CM25	I find it hard to get the information I need to do my job	0.26

Table A2. Cont.

No.	Item Wording	Loading
<b>F5</b>	<b>Directive communication</b>	
CM53	The principal tells staff how things are to be done	0.50
CM40	The principal often directs work	0.48
CM41	The principal gives information that helps staff to carry out their roles	0.43
CM34	The principal supplies information about how things are done around here	0.42
CM46	Staff receive sufficient information from the principal to know how to do their jobs	0.41
<b>F6</b>	<b>Downward supportive communication</b>	
CM48	The principal compliments staff	0.76
CM22	The principal provides staff with positive feedback	0.63
CM61	The principal is encouraging	0.61
CM57	The principal gets behind staff when they are doing things about which they are not confident	0.34
<b>F7</b>	<b>Upward supportive communication</b>	
CM16	Staff members give emotional support to the principal	0.69
CM28	Staff give moral support to the principal	0.68
CM27	Staff are generally honest in their interactions with the principal	0.27
<b>F8</b>	<b>Democratic communication</b>	
CM38	The principal allows staff to contribute their thoughts on issues	0.66
CM39	The principal listens to suggestions from staff	0.64
CM17	The principal asks for input from staff on policy issues	0.58
CM33	The principal indicates that the opinions of staff are worthwhile	0.45
CM49	The principal indicates that staff input in decision making is valuable	0.44
CM21	Staff are encouraged to work with one another to change or review aspects of the school's organisation	0.44
CM29	Staff are able to influence the principal's decisions	0.42
<b>F9</b>	<b>Cultural communication</b>	
CM43	Staff members show new staff "the ropes"	0.75
CM23	Staff members give new employees information about how things should be done at this school	0.68
CM31	Staff members inform new staff about the school's past achievements	0.58
CM62	Staff members inform new staff about the school's mission	0.53
CM44	Staff members tell new staff stories about people or past events in the school	0.51
CM50	The principal is actively involved in the induction of new staff	0.27
<b>F10</b>	<b>Adequacy</b>	
CM20	Staff members receive enough information from one another	0.39
CM30	Staff members receive enough information from the principal to know what is going on	0.35
CM05	Information that I miss is passed on to me by colleagues	0.33
CM45	All efforts are made to ensure staff know what is happening	0.32
CM14	I do not get enough information about what is going on in this school	0.32
CM35	Staff members have ample opportunities to meet and discuss work issues with one another	0.29

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