Constructing a described achievement scale for the International Civic and Citizenship Education Study

Julian Fraillon, The Australian Council for Educational Research, fraillon@acer.edu.au

Abstract

This paper presents a draft described civic and citizenship cognitive achievement scale based on the International Civics and Citizenship Education Study (ICCS) field trial cognitive test items and student achievement data. The paper briefly outlines the process of generating the described scale before presenting and examining the substance of the scale. The scale is based on data from the 80 test items used in the ICCS field trial that have been included in the ICCS main survey test instrument. The described scale comprises four discrete described achievement levels that are further articulated by examples of achievement. Key aspects of the cognitive differences between the levels are discussed and some questions raised about the way in which the achievement of students below Level 1 will be dealt with in the main survey.

Keywords: *ICCS, Civics and Citizenship, Achievement Scale, Progress Map*

Introduction

The purpose of the International Civic and Citizenship Education Study 2009 (ICCS) is to 'investigate the ways in which young people are prepared to undertake their roles as citizens in a range of countries in the 21st century' (IEA, 2007). The study will report on data collected from a suite of international instruments with reference to the study's Assessment Framework (IEA, 2007). The international instruments comprise a student achievement cognitive test, a student questionnaire, teacher and school questionnaires and a survey of the overarching context for civic and citizenship education in each participating country. Students from most participating countries will also complete a regional instrument to collect civic and citizenship education outcomes relating to content and concepts that are especially relevant to a given geographical region (Europe, Latin America and [East] Asia). In late 2007 and early 2008, 32 countries participated in the field trial of the ICCS instruments. This paper focuses on ICCS field trial data from the international cognitive test instrument that will be used primarily to measure the civics and citizenship cognitive achievement of students within and between countries. Many countries participating in ICCS also participated in CIVED, and the inclusion of secure trend items from CIVED in the ICCS cognitive test will enable comparisons of achievement over time in those countries.

As well as aiming to providing reliable and valid measures of student cognitive achievement

in civics and citizenship, the ICCS cognitive test aims to build on the work of CIVED by providing sufficient substantive item data to enable construction of a described scale of civics and citizenship achievement. ICCS is explicitly linked to CIVED for the purpose of longitudinal comparisons and also aims to expand the breadth of civics and citizenship related data that were collected in CIVED. Conceptually these connections and extensions are detailed in the ICCS Assessment Framework (IEA, 2007) that builds on conceptual model of CIVED (Torney-Purta, Lehmann, Oswald and Schulz, 2001) by defining and describing a broader and more explicit set of concepts and constructs. The ICCS field trial international student test was linked explicitly to CIVED by the inclusion of 19 (exactly half the number of items used in the CIVED cognitive test) common trend items from CIVED. Seventeen of these CIVED trend items have been included in the ICCS main survey cognitive test instrument. Seventy-nine new items were constructed and used in the ICCS field-trial cognitive test instrument. Sixty-three of these items have been included in the ICCS main survey instrument.

As with CIVED, the ICCS cognitive test items will be analysed using the one parameter Rasch Item Response Theory (IRT) model. This enables the measurement of international achievement across countries on the same metric in ICCS as was used in CIVED. An additional benefit using IRT scaled data is that the substantive content of the ordered items can be synthesised to form a meaningful described civics and citizenship achievement scale or 'progress map.' Examples of similar work in the field of Civics and Citizenship Education can be seen in *Conceptual understanding in social education* (Doig B; Piper K; Mellor S; Masters G, 1994) and the more recent *National Assessment Program – Civics and Citizenship Report 2004* (MCEETYA, 2006).

As a precursor to ICCS, some sense of the substance of the achievement scale was provided in CIVED through discussion of specific items and with the inclusion of an international item difficulty map in the international report (Torney-Purta, Lehmann, Oswald and Schulz, 2001) however, the level of detail that could be included in the report was limited by the relatively small number of cognitive test items. The ICCS main survey cognitive test instrument comprises 80 test items (including 17 CIVED trend items) with a total of 86 score point boundaries that can be linked to substantive descriptions of achievement to contribute to a described achievement scale. This paper describes the process of constructing a draft described scale of cognitive achievement using the ICCS field trial data, discusses the contents of the draft scale and outlines some of the issued that will be further considered in preparation for the construction of a described cognitive achievement scale for the ICCS main survey.

Methodology and Data Sources

Data sources

The described achievement scale presented in this paper is based on data from the field trial data analysis for ICCS which was carried out in 32 participating countries between October 2007 and April 2008. In each country, a minimum of 25 schools with at least 600 students from intact classrooms in the target grade were selected. The target grade corresponds to the eighth year of schooling provided that the minimum age of students is 13.5. The international student test data were derived from 98 items that elicited 106 score points (90 multiple choice items and eight short constructed response items) in six different clusters. One cluster comprised only the CIVED trend items and the new ICCS items were distributed across the remaining five clusters. The clusters were administered in complete rotated design with six booklets, each consisting of three 20-minutes clusters meaning that each individual student completed one 60 minute test booklet comprising three cluster. Booklets were randomly allocated to students in the sample and, because each test item appeared in three of the six booklets, each test item was presented to half of all students.

Data Analysis

One parameter (Rasch) IRT was used for scaling the test items. A number of dimensionality and differential item functioning analyses are conducted on the test item data as part of the scaling process (for further details of these see Schulz and Sibberns, 2004). Only those items that have shown sufficient fit to the unidimensional achievement construct within and across counties have been included in the ICCS main survey instrument.

Following analysis of the field trial data, 80 (74 multiple choice and 6 open-ended response items) were selected for inclusion in the ICCS main survey instrument. In order to maintain integrity with this instrument, the draft described scale in this paper has been constructed only with reference to these 80 items.

Constructing the Scale

Item descriptors have been written for each item (or each score category in the case of partial-credit constructed response items). These item descriptors detail the necessary civic and citizenship content and cognitive processes (with reference to the ICCS Assessment Framework) that are assessed by each item. When paired with the scaled threshold (difficulty) of the matching item, the item descriptors can be ordered to produce a scaled substantive item map.

The usefulness of this substantive item map is limited by the fact that the item content is a "sample" of all possible items that could be used to assess the content and cognitive processes and because the high level of specificity of the item descriptors can make it difficult for readers to generalise about student achievement across the scale. The solution to these problems is to find conceptual commonality (both in the content and the processes) within different sections (levels) of the scale and to create summary descriptions of the levels of achievement that are evidenced across the scale. These summary level descriptors can then be supplemented by examples of the test items to ensure common understandings of the nature of achievement at each level on the scale.

It must be remembered that the process of constructing levels is a somewhat artificial division of a continuous scale in to discrete elements. The number, breadth (in scale points) and positioning of the levels ideally depends only on the substantive congruence of the items within the levels however, at a practical level the convention is to consider levels of equal breadth that still represent genuine substantive differences in achievement. The final process of identifying and describing the content of the achievement levels is typically a balance between the substantive and empirical content of the scale. The empirical aspect of this process relies both on the distribution of items and of student achievement across the scale and can also be established in terms of the response probability (RP) of the scale (OECD, 2005). The substantive aspect of this process relies on judgment of the conceptual congruence of items grouped within levels.

Based on the substantive and empirical analysis of the item map and student data, the levels of the ICCS draft achievement scale were set to be 0.8 logits wide with category boundaries at -1.3, -0.5, 0.3 and 1.1 logits on the trial data achievement scale.

Empirical Achievement Scale

Figure 1 shows the person item distribution map for the 80 items and approximately 19,000 students in the ICCS field trial. The digits on the left edge of Figure 1 are scale points (in logits) for the civic and citizenship cognitive test ability/ difficulty scale. Each number to the right of the vertical dashed line represents an item used to construct the described scale. The vertical position of the items represent the scaled difficulty of the item. The different score categories (1 or 2) for the open-ended response items are shown by the suffix ".1" or ".2", for example "48.2" refers to the score code 2 for item 48. The "X"s to the left of the vertical dashed line show the distribution of student achievement on the scale. The dashed lines on the picture indicate the approximate positions of the level categories established from the field trial data and item descriptors. Because the contents of the ICCS instruments are still secure, the item

descriptors used to construct the scale have not been included in this paper.

[Take in Figure 1 about here]

Broadly Figure 1 shows that the test is well targeted with the difficulties of the items listed on the right largely matching the distribution of student abilities on the left. Figure 1 also shows that the bulk of the students and items are located within levels 1, 2 and 3 on the achievement scale. Level 4 on the scale contains only five items and accounts for relatively few students It is interesting to note that each of these five items represent the full credit (2 score points) of achievement on five of the open-ended response items. Currently a "Below Level 1" category has been allocated but not described. From Figure1 it can be seen that only one item lies in this category and a small percentage of students are achieving at this level. This observation will be discussed in greater detail later in this paper. The item locations shown in Figure 1 together with their descriptors were used to compile the draft described ICCS cognitive achievement scale.

Draft Described Achievement Scale

Table 1 contains the draft described achievement scale based on the ICCS field trial data. Four levels of achievement have been described and each level is further described through examples of student achievement on the test indicative of each level.

[Take in Table 1 about here]

Findings and Discussion

The draft described achievement scale explicates the development of student cognitive achievement. This section will further describe the four levels of the achievement scale shown in Table 1, and speculate on the critical achievement differences between the levels.

Level 1 of the scale can be characterised by students' engagement with the fundamental principles and broad concepts that underpin civic and citizenship student learning. Students operating at this level are familiar with the "big ideas" of civics and citizenship, they are likely to be able to make accurate judgments about what is "fair" or "unfair" and to demonstrate a superficial, mechanistic working knowledge of the operation of civic and civil institutions. In addition to this, students working at Level 1 demonstrate awareness of citizens' capacity to have influence their own local context. One the key factor that differentiates Level 1 achievement from that of higher levels is the degree of specificity of students' knowledge and conceptual understanding.

Students working at Level 2 are able to demonstrate some specific knowledge and understanding of the most pervasive civic and citizenship institutions, systems and concepts. These students demonstrate can understanding of the interconnectedness of civic and civil institutions, and the processes and systems by which they operate rather than only being able to identify their most obvious characteristics. They are able to demonstrate understanding of the connection between principles or key ideas and their operationalisation through policy or practice in everyday, familiar contexts. These students are able to relate some formal civic processes to their everyday experience and can demonstrate understanding that the potential sphere of influence (and by inference responsibility) of active citizens lies beyond their own local context. One the key factor that differentiates Level 2 achievement from that of higher levels is the degree to which students make use of their knowledge and understandings to evaluate, justify and civic and citizenship policies and practices.

Students working at Level 3 demonstrate an holistic rather than segmented knowledge and understanding of civic and citizenship concepts. They make evaluative judgements about the merits of policies and behaviours from given perspectives and are able to justify positions or propositions based on their understanding of civic and citizenship systems and practices. Students working at Level 3 demonstrate understanding of active citizenship practice as a means to an ends rather than only as a response to a given context. To this end, students are able to evaluate active citizenship behaviours in light of their desired outcomes. One key factor that differentiates Level 3 from Level 4 achievement is the degree to which students can use their civic and citizenship knowledge and understandings to hypothesise on likely outcomes and motivations for civic and citizenship policies and actions.

Level 4 represents the highest level on the described scale and could be regarded as an aspirational achievement level for students in the ICCS target grades. A small but still meaningful number of students of students demonstrated achievement of this level. Only five of the ICCS field trial items contributed to the description of Level 4. Each of these items represents the highest category of credit available for an open-ended response item. In each case, the items required students to generate two conceptually different justifications for or hypothetical benefits of courses of action that, taken together, could form the basis of a line of reasoning or argument. Level 4 can be seen as a precursor to student capacity to generate complex reasoned argument based on civic and citizenship knowledge and understandings. The lesser score category (1 score point) for each of these five items require students to generate only one response. These score categories appear in Levels 2 and 3, so there is some evidence to suggest that the capacity to generate multiple connected ideas from different perspectives, rather than generating a single idea from a single perspective, marks a meaningful and substantial difference between Level 4 achievement and achievement at the

lower levels.

Conclusion and Implications

The draft described achievement scale and examples in give substance to the empirical student achievement data collected in the ICCS field trial. This draft is regarded as a model of process and substance for the development of a described student achievement scale for the ICCS main survey. Analysis of the field trial data indicated that the 80 items used to describe this scale can be considered as belonging to a unidimensional achievement construct. It is possible, although unlikely given the results of the field trial, that the ICCS main survey data may support the inclusion of achievement subscales in the achievement scale. This question will be revisited in light of the ICCS main survey data.

One further question highlighted by the described scale and field trial data relates to the students achieving below described Level 1. This is not a unique problem in international studies in which the achievement range of students across countries is often far greater than it is practical to target with a finite set of assessment items in a single testing session. Overall the targeting of the ICCS achievement items to the students appears to be very good, and the achievement of the great majority of students can be well described using the 80 main survey items. It is of course possible to shift the position and alter the width of the achievement levels based on the main survey data however neither of these would enable further description of below Level l achievement. Future assessment cycles or ancillary assessment work may be able to provide more evidence of the nature of student achievement below Level 1.

Based on the experience of the ICCS field trial it appears that the cognitive test items and student data will provide ample resources for the construction of a described student civic and citizenship achievement scale that will account for the achievement of the bulk of students in all countries. Ideally such a described scale will be used both to understand better the nature of student civic and citizenship achievement and to assist in the planning and provision of educational resources and programs to contribute to the ongoing challenge of improving civic and citizenship educational achievement outcomes.

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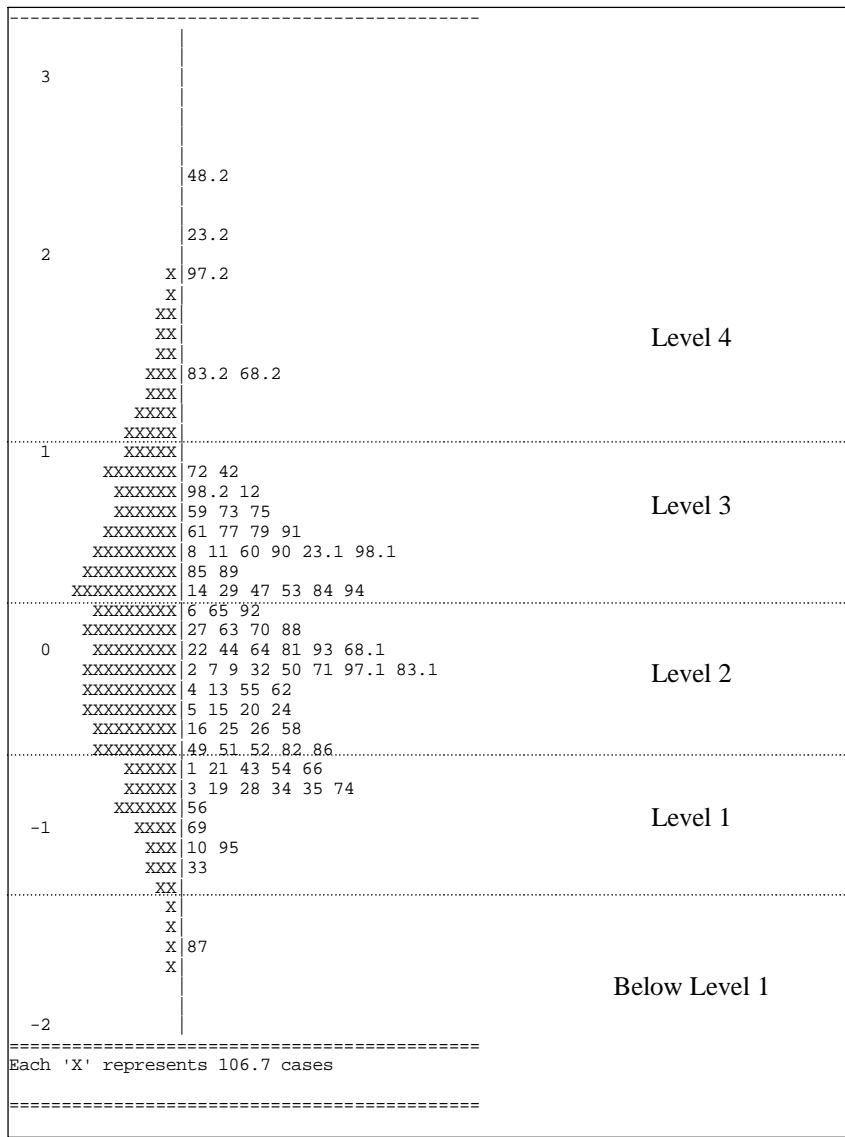
Figure 1: Person/Item Distribution Map for ICCS Field Trial including Draft Levels

Table 1: Draft ICCS described cognitive achievement scale based

Level 4	Students working at Level 4 for example:
Students working at Level 4 generate accurate, hypotheses on the benefits, motivations and societal outcomes of institutional policies and citizens' actions. They demonstrate strategic thinking by providing multiple related reasons to support policies and actions that can be linked to form the basis of coherent argument.	• identify likely strategic aims of a program of ethical consumption; • suggest mechanisms by which open public debate and communication can benefit society; • provide multiple reasons to support the provision of social welfare benefits to people in need; • suggest related benefits of widespread cognitive cultural understanding in society.
Level 3	Students working at Level 3 for example:
Students working at Level 3 make connections between the processes of social and political organisation and influence, and the legal and institutional mechanisms used to control them. They integrate, justify and evaluate given positions, policies or laws based on the principles that underpin them. Students demonstrate familiarity with the strategic nature of active participation. They evaluate courses of civic action and provide simple hypotheses about the likely outcomes of civic action.	• relate the independence of a statutory authority to maintenance of public trust in the authority; • justify the separation of powers between the judiciary and the parliament; • relate a policy of positive discrimination to equality and inclusiveness; • identify that violent protest can undermine civic action by shifting the focus of attention from the issue; • evaluate a policy with respect to equality and inclusiveness.

Level 2 Students working at Level 2 demonstrate familiarity with the broad concept of representative democracy as a political system. They recognise ways in which institutions and laws can be used to protect and promote a society's values and principles. They recognise the potential role of citizens as voters in a representative democracy, and generalise principles and values from specific examples of policies and laws (including human rights). Students demonstrate understanding of the influence that active citizenship can have beyond the local community. They generalise the role of the individual active citizen to broader civic societies and the world.	Students working at Level 2 for example: • identify that informed citizens are better able to make decisions when voting in elections; • recognise that the right to work is a human right included in the UN Universal Declaration of Human Rights; • describe the main role of a legislature/parliament; • recognise that pressure groups provide way for minority opinions to be heard in the community; • justify a policy of voluntary voting with respect to freedom of political expression.
Level 1 Students working at Level 1 demonstrate familiarity with equality, social cohesion and freedom as principles of democracy. They relate these broad principles to everyday examples of situations in which protection of or challenge to the principles are demonstrated. Students also demonstrate familiarity with foundation concepts of the individual as an active citizen: they recognise the necessity for individuals to obey the law; they relate individual courses of action to likely outcomes; and they relate personal characteristics to the capacity of an individual to effect civic change.	Students working at Level 1 for example: • relate freedom of the press to the accuracy of information provided to the public by the media; • identify that the secret ballot supports voter freedom of choice; • suggest that it is desirable for leaders to be aware of the needs of the people over whom they have authority; • recognises that one role of government is to protect the community from harm; • recognise that the UN Universal Declaration of Human Rights is intended to apply to all people.