

PRE-SERVICE TEACHER PERCEPTIONS OF ICT TEACHERS

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Abstract

What does an ICT teacher look like? Using the ideas pioneered by Goodenough and Chambers, pre-service education students were initially asked to draw an ICT Teacher. In 2013, the task given was: Draw what an ICT Teacher looks like, sounds like and feels like. This elaboration on the task produced remarkably different results. The pictures produced focused on teacher attributes not previously evident: qualities such as open-mindedness, compassion and understanding, collaboration and sharing became evident. This paper examines four years of data and draws messages that can inform teacher educators and demonstrates views and perceptions of the qualities and attributes of ICT Teachers.

Introduction

This study examines data from four years of exploring pre-service teacher beliefs about ICT Teachers. In 2011 and 2012, participants in an ICT course were asked to 'Draw an ICT Teacher'. In 2013 and 2014, participants were asked to 'Draw what an ICT Teacher looks like, sounds like and feels like'. The change in task in 2013 was quite accidental. One student in the group asked for clarification of the task. The author's response, seeking to be economical with information and not wishing to influence participants' drawing, restated the task as draw what an ICT teacher looks like, sounds like and feels like. The use of this description of the task was related to recent work in classes about 'deep thinking', an outcome of the Y-chart strategy (looks, sounds and feels like). This restatement created a significant shift in participant response, the subject of this paper.

Theoretical Underpinning

Four notions underpin this study: (a) the Draw a Man Test by Goodenough (1926), (b) the Draw a Scientist Test (DAST) (Chambers, 1983), (c) the Draw a Scientist: Checklist (DASTT-C) (Thomas, Pederson, & Finson, 2001), and (d) a graphic organizer (the Y-chart). While Goodenough's test was primarily targeted at exploring intellectual growth in young children, Chambers' test sought to identify students' perceptions about science and scientists. Norman (1983), explains that mental models (pictures) reflect beliefs acquired through observation, instruction, or inference. In further literature, Goodman (1988) suggests that teachers are influenced by images from the past. His research suggests prior experiences have a significant impact on one's professional perspectives. The later DASTT-C elaborated on the original thinking of Chambers and provided a more substantial tool for the analysis of student images. Y-charts are commonly used in schools to probe for deeper understanding of ideas.

The use of images in each of these tasks provided an opportunity for students (pre-service teachers) to make their thinking visible, that is, the ideas in their heads, those pre-conceptions that had been influenced by past experiences and which have created numerous stereotypical notions of what science and scientists are, or in this instance, what ICT teachers are. Drawing pictures in this way is an often-used strategy in *constructivist* classrooms, where the teacher seeks to know (and understand) what the students already know.

In Chambers’ (1983) original work, he identified seven stereotypical images of science and scientists. These are:

Table 1

Stereotypes of Scientists (Chambers, 1983)

1. Clothing: lab coats etc.	5. Symbols of research: laboratory equipment (beakers, test tubes, etc.)
2. Facial hair: beards and moustaches	6. Products of science: rockets
3. Eyeglasses	7. Captions: Zap, Eureka, etc.
4. Symbols of knowledge: books, and more recently the Internet	

The DAST-C (2001) research elaborated on these seven features, providing a further eight clusters of stereotypical conception (or alternative conception).

Table 2

Stereotypes of Scientist (Thomas et al., 2001)

1. Male gender	5. Mythical stereotypes
2. Caucasian	6. Indications of secrecy
3. Indications of danger	7. Working indoors
4. Light bulbs	8. Middle aged or elderly males

Data from 2011 and 2012 were examined using variations on these frames and will be discussed later.

The use of the Y-chart normally uses a matrix (see Figure 1). In this exercise, students were encouraged to use graphics and annotations to show their thinking.

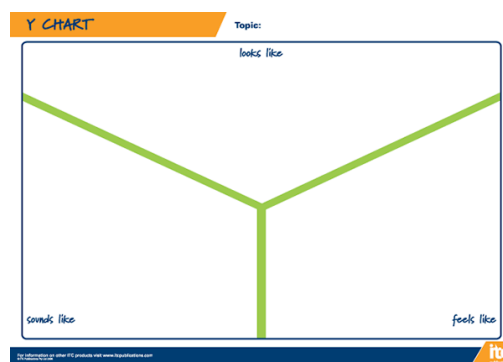


Figure 1. Y-chart matrix.

Frangenheim (Rodin Publications, 2002) describes the Y-chart in this manner:

Teachers have been using the Y Chart as an effective tool in the classroom for many years. Essentially it serves as an analytical tool since students and teachers strive to discover more and more about a topic using the sensate approach of what does this topic Look, Sound and Feel like (and even taste and smell and move like). It is usually completed as a pre-product stage or a brainstorm exercise from which one can start creating a product such as a written report, bubble maps, Power points, interviews and more. (47)

The Y-chart in the task about ICT Teachers connects with a deeper and more cognitive side of the participants’ thinking. Using a Y-chart for this task is analogous to asking participants to analyse and create (Higher Order Thinking Skills or HOTS in Bloom’s language), whereas the original task, Draw an ICT Teacher, maps back to the Lower Order Thinking Skill (LOTS) of remembering. In this instance (original task), the conceptions held by a participant about ICT teachers are used to create a *brain dump* about ICT teachers. These conceptions have been formed over many years and replicate the experiences the participants have themselves had. The second task, using the Y-chart, challenges participants to think about the same issue in a different way.

In Figure 2 the two different tasks are placed on Bloom’s ladder at levels of different complexity.

<i>Higher Order thinking</i>	Creating: requires generation of ideas and using them to create and design objects and solutions	<i>Revised Task 2013-2014: The use of a Y-chart provides opportunity for participants to engage at one or more of these levels</i>
	Evaluating: requires judging information using some criteria or standard	
	Analysing: requires examining specific parts of information to “see” the underlying ideas	
<i>Lower Order Thinking</i>	Applying: requires using information	<i>Original Task 2011-2012: Draw an ICT Teacher is operating at this approximate level</i>
	Understanding: requires understanding information	
	Remembering: consists of memorizing or identifying facts	

Figure 2. Task analysis using Bloom’s Revised Taxonomy.

The Research Questions

This study explores and discusses, using retrospective insight, two questions:

1. *What images do pre-service teachers hold of ICT Teachers?*
2. *To what extent can the data available be used to design/develop a valid measure of perceptions about ICT Teachers?*

Methodology

This study uses a qualitative methodology during data interpretation and broadly seeks to answer the larger questions: *What is going on here? What are the consequences and messages to be drawn?*

From a retrospective position, much of this work has been accidental, but insightful. Students (in teacher education courses) in four ICT classes, and over a four-year period, were asked to draw their perceptions of ICT Teachers. The ages of the students ranged from 18 to 51 years of age. This was a brief introductory activity to a 40-hour intensive class conducted over five days. After 20 minutes to complete the task, the images were returned to the instructor of the class. The only identifier required was an indication of gender. The next 30 minutes were then spent discussing the artifacts submitted, using a document camera to project onto the lecture theatre screen. Students were encouraged to pass comments on the work of their peers. In 2011 and 2012, there was considerable debate about the stereotypical images portrayed and it was evident that notions of, for example, gender, images of technology, maleness, facial hair etc. prevailed.

The author examined the images by year and by gender for all four years. Tables were constructed to analyze data for the first two years and to plot it against the modified frames of Chambers (1983) and Thomas et al. (2001). Data from 2013-14 was more problematic as a frame did not exist to undertake this examination. These data were also examined by gender. Initially these data appeared to fall into two clear categories: (a) descriptions of teachers and students and (b) ICT artifacts. Further analysis revealed that this was a superficial classification and the groupings could be expanded to four major clusters with a number of subsets.

Data Collection and Analysis

In 2011, there were 55 participants (Female= 34; Male=13; Unknown=8). Significant features from these data were:

- Acknowledgment by females (n=25) and males (n=5) that 'hair style' was a concept associated with the notion of an ICT Teacher (see Figure 3).
- Twenty two females associated 'maleness' with being an ICT Teacher
- Three females suggested 'agedness' was a factor in their conceptions
- Nineteen females and 10 males noted eyeglasses.
- Symbols of technology represented included: computers; tablets; mobile phones; MP3 players; the Internet; television; pencils in pocket; smart-boards; computer graphics; communication tools

More open responses/observations from females in 2011 included commentary, such as teachers were:

- Nerdy; Hacker; Computer savvy; Studios
- Serious; Boring/dull
- Highly organized; Logical
- Passionate; Smart; Intelligent; Informed; Engaging
- Unusual; Geek; Awkward; Technology T-shirt
- Creative; Talented; Imaginative; Open-minded
- Modern
- Outgoing
- Formal; Formal clothes

The more open responses/observations from males (2011) included:

- Tie
- Good attitude
- Modern 21st century
- Creative

Data from 2012 was not dissimilar. It is interesting to note that in both 2011 and 2012, participants are starting to look at the personal qualities of teachers, shown in the open responses above. Examples of ICT Teachers from 2011 and 2012 are shown in Figure 3.

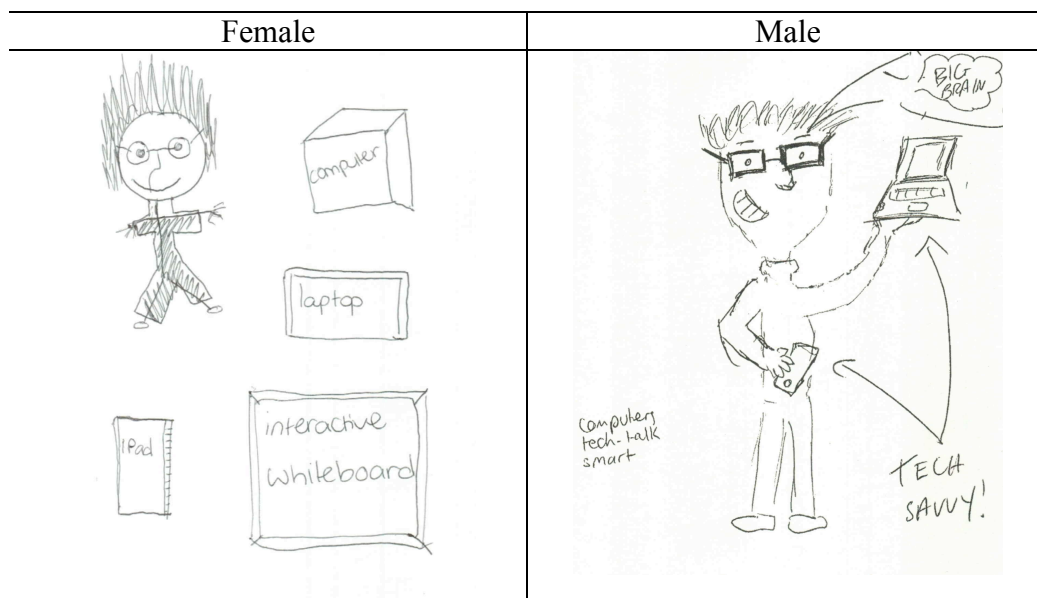


Figure 3. Images from the 2011 ‘Draw an ICT Teacher task.’

Data from 2013 and 2014 is where the shift in student perception starts. Participants were noted to focus more on the teacher and teaching than the artifacts of ICT.

Examination of the work from 2013 and 2014 has allowed the development of a four-level framework (Table 3).

Table 3

Classification of 2013-14 Images

1.	Teaching practice
a.	Teaching practices
b.	Collaboration
c.	Approaches to problem solving
d.	Classroom management
e.	Knowing the learner
2.	Connectedness
a.	Connections: networks
b.	Connections: across curriculum
3.	Attributes of the teacher
a.	Personal qualities
b.	Appearance
c.	Focus on language
d.	Teacher-Student interaction
4.	ICT Artifacts: these could be classified into ICT types

The commentary below expands on some of the information in Table 3.

1. *Teaching practice*: this included Teaching practices; Collaboration; Approaches to problem solving; Classroom management; and Knowing/Understanding the learner: knowing what they already know (constructivism)
2. *Connectedness*: This included connections to networks (local, national and global) and connectedness of the curriculum (relevance and authenticity)
3. *Attributes of the teacher*: Personal qualities of a good teacher; Appearance; Focus on language; Appearance; Teacher-Student interactions
4. *ICT Artifacts*: The artifacts noted could be classified as computers/tablets, audio/video devices, communication tools etc.

The examination in 2013 and 2014 explored 55 student images. The fourth level of this frame, ICT Artifacts, drew considerably fewer ideas than in the previous two years. Data and images from the 2014 tasks showed the most significant shift.

First the images:

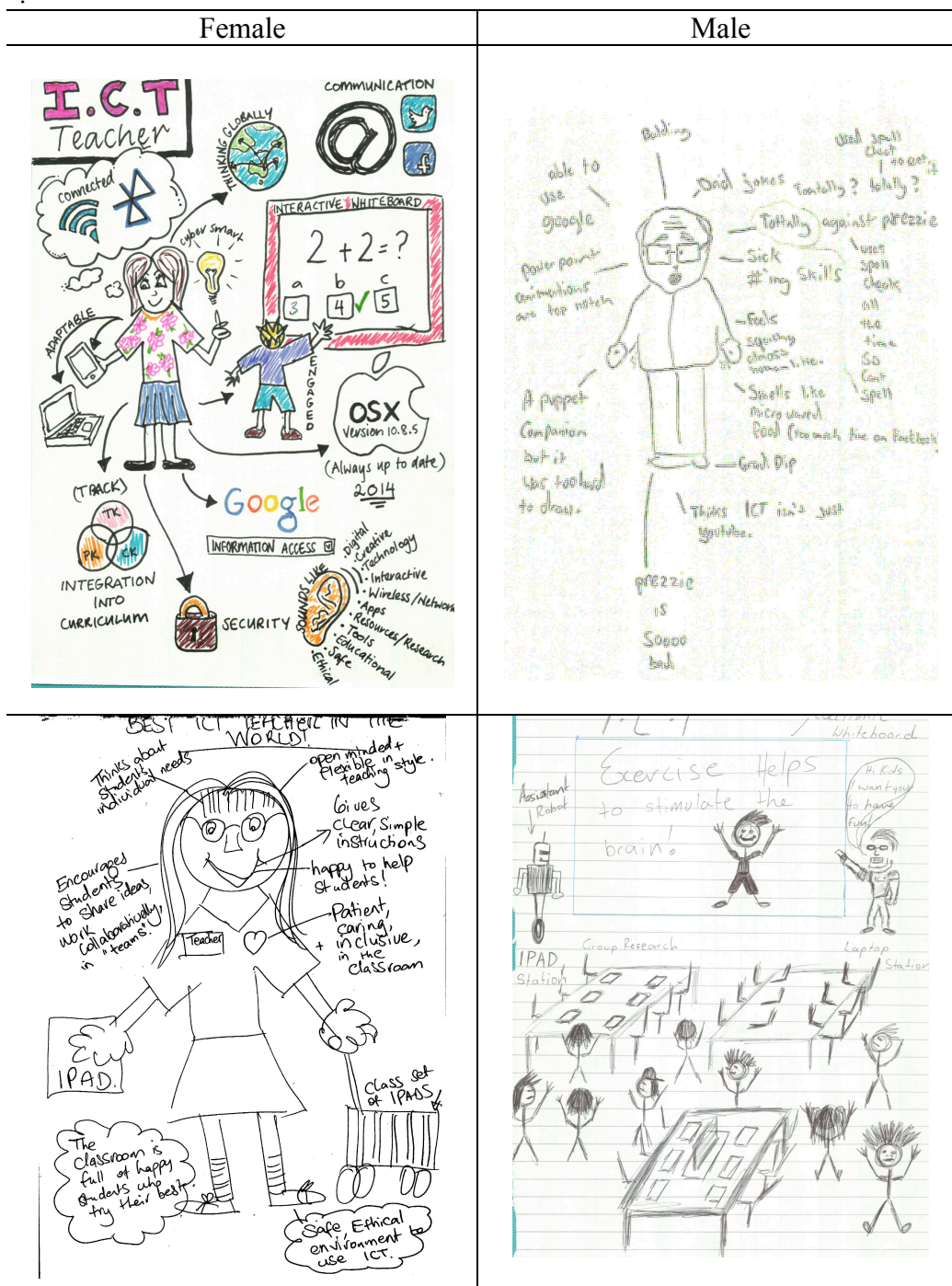


Figure 4. Images from the 2014 ‘Draw what an ICT Teacher looks like, sounds like, feels like’ task.

As is well illustrated in the four images of Figure 4, aggregation of the data from the 2013/14 tasks (Table 4) indicates the themes that were constantly re-occurring.

Table 4

Data from 2013 and 2014

Female 2013/14 n=42	Male 2013/14 n= 23
<p><i>Knowing the learner and how they learn best</i></p> <ul style="list-style-type: none"> • understands the learner, works at their ability level • is inclusive • understands ICT integration • fosters creativity • encourages mobile learning <p><i>Collaboration</i></p> <ul style="list-style-type: none"> • uses collaborative practices • encourages group work • encourages discussion • works collaboratively and shares <p><i>Approaches to problem solving</i></p> <ul style="list-style-type: none"> • challenges students • encourages discovery <p><i>Classroom organisation</i></p> <ul style="list-style-type: none"> • focused on seating plans • is surrounded by students • roams the class and is never still <p><i>Connectedness</i></p> <ul style="list-style-type: none"> • supports connectedness, engagement and communication • is connected to the world • is relative to today's students <p><i>Attributes of the teacher</i></p> <ul style="list-style-type: none"> • is dedicated and less formal • fun and boring at the same time • uses a quite different language • has a trendy appearance • is up to date • reflects on teaching practice • has 21st century skills • understands digital pedagogies • understands safety and ethics • is always positive • compassionate and caring 	<p><i>Knowing the learner and how they learn best</i></p> <ul style="list-style-type: none"> • uses eLearning • encourages mobile learning <p><i>Collaboration</i></p> <ul style="list-style-type: none"> • students collaborate through technology <p><i>Approaches to problem solving</i></p> <p><i>Classroom organization</i></p> <ul style="list-style-type: none"> • Is surrounded by students: <p><i>Connectedness</i></p> <ul style="list-style-type: none"> • anywhere, anytime computing • uses blogs • uses online learning spaces • uses the cloud • encourages digital interactions • conducts virtual experiments <p><i>Attributes of the teacher</i></p> <ul style="list-style-type: none"> • is a mentor/guide • is knowledgeable, geeky, and a guru • uses clear and concise language • is adaptable and open-minded • looks like anyone else • is friendly and encouraging • is innovative and highly connected • learns and listens • is cyber smart • is compassionate and caring • is self reflective
<p><i>ICT artifacts:</i> Computers/laptops/tablets; smart phones; data projectors; interactive whiteboards; the Internet; video/audio devices;</p>	

Discussion

In revisiting the research questions, what has been learned?

Research Question 1. *What images do pre-service teachers hold of ICT Teachers?*

The ideas held by pre-service teachers about ICT teachers appear to be an artifact of the task or question posed. In the data analysed, for 2011 and 2012, there is a clear focus on technological artifacts used by the teacher and class, whereas in 2013 and 2014, there is a shift towards notions that focus more on the teacher as a person, including what good teaching should look like. This suggests that researchers need to be clear as to what they are seeking to investigate and how the data collected is interpreted. The information obtained using the Y-chart organizer provided a better (and deeper) idea of pre-service teacher thinking than can be obtained using the standard 'Draw a picture of ...' tool.

Research Question 2. *To what extent can the data available be used to design/develop a valid measure of perceptions about ICT Teachers?*

There appears to be doubt over the ability of the previous iterations of Draw a man/scientist/ICT teacher task to inform teacher educators about 'what is truly inside students' heads. This seems well served by data that shows that the question or task given is a determinant of the conceptual outpouring. It is argued that the original Draw an ICT Teacher task is closed and encourages participants to draw on previous conceptual ideas (shallow knowledge, LOTS). The use of an extended and deeper probing question (open, HOTS) suggests that what participants present is an artifact of the question. Closed questions are symptomatic of how pre-service teachers (and teaching faculty) have been taught and is thus replicated in the proposed task. It may also be true that this is how many researchers themselves have been taught and that the use of such open questions does not come easily.

The use of open questions has revealed much about the personal qualities shown in pre-service teacher beliefs about ICT teachers, together with notions of what good classrooms and good teaching and learning practices look like. The evidence analyzed is rich in a different set of conceptual ideas held by pre-service teachers, ideas that have been developed through deeper thinking.

Conclusion

To better understand what pre-service teachers bring to classes, combining the traditional Draw an ICT teacher task with the ideas created by drawing what an ICT teacher looks like, sounds like and feels like, might achieve better outcomes. Combining the two may serve a dual purpose: the latter provides teaching staff with notions of what pre-service teachers perceptions of ICT teachers and their tools are, whilst the second task reveals much about the qualities of effective teachers using ICT. A better task description would be to combine the two notions and ask pre-service teachers to: *Draw and use pictures to show what an ICT teacher looks, sounds and feels like, as well as showing the tools they use in their classes.*

This notion will be the subject of future research.

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