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Development of the Motivation Assessment for Team Readiness, Integration, and Collaboration (MATRICx) Self-Scored Report Form: A Qualitative Study on Translating Measurement Findings for Team Development

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Development of the Motivation Assessment for Team Readiness, Integration, and Collaboration (MATRICx) Self-Scored Report Form: A Qualitative Study on Translating Measurement Findings for Team Development

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Certificate of Approval

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CERTIFICATE OF APPROVAL

This is to certify that the Capstone Project: (Include Title)

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Submitted in partial fulfillment of the requirements for the degree of Doctor of Occupational Therapy, The George Washington University has been approved.

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Development of the Motivation Assessment for Team Readiness, Integration, and Collaboration (MATRICx) Self-Scored Report Form: A Qualitative Study on Translating Measurement Findings for Team Development

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Abstract

The Motivation Assessment for Team Readiness, Integration, and Collaboration (MATRICx) has been shown to provide information on intrapersonal readiness to collaborate within a team. This study aims to understand and develop an innovative approach to presenting a self-scoring format for the MATRICx and to determine how results of the assessment tool could be interpreted to understand individual motivation in collaborative healthcare and biomedical teams. The MATRICx Report Form is a self-scoring version of the MATRICx that can help users interpret their own motivational profile. A qualitative study was conducted to examine user's experience with the report form, ways of interpreting results, and insights into how participants might apply what is learned through this self-scoring format to their personal development. Understanding the user experience and identifying features of the report form found to be helpful can provide information about how to improve the usefulness of the form for end-users. Initial analysis suggests that the Report Form format was confusing and will require revisions including the placement of the information on the form and format for reporting transformed calibrations. Participants also reported detailed instructions on scoring would facilitate the use of the report form. A revised Report Form was developed and future directions for using the forms to enhance team effectiveness is discussed.

Keywords: questionnaire development, collaboration, readiness, focus group

Introduction

Collaboration is increasingly required in research (Wuchty, Jones, & Uzzi, 2007) because of the need for a wider range of scientific expertise, advanced instrumentation needed to address research questions, and larger project teams. Most studies on individual readiness for scientific teams have focused on interpersonal skills that occur in the context of environment (Cummings & Kiesler, 2008; Stokols, et. al., 2003) such as infrastructure that supports team science, group cultures that reward team scholarship, large-scale collaborative opportunities, government incentives, unique research challenges as well as scientific expectations, and others. The Motivation Assessment for Team Readiness, Integration, and Collaboration (MATRICx) survey was designed as an evidence-based assessment of motivations and threats to collaborative engagement for health, medical, and research workforces (Lotrecchiano, et. al., 2015). There is preliminary evidence to support the theoretical foundation from a scoping review (Lotrecchiano, et al., 2016) and item level analysis (Mallinson, et al., 2016), which showed that the MATRICx had adequate psychometric properties but that inexperienced and experienced participants defined the construct of motivational readiness differently.

To date, there are few tools to help individual researchers explore, integrate, and understand what motivates them to collaborate in team science projects. Such information would enable researchers to explore how they can apply the MATRICx to assess their own readiness for team collaboration and inform their in-group behaviors (Lotrecchiano, 2016; Mallinson, 2016). The information provided by MATRICx can inform participants' personal view of their level of motivation for collaboration and thus influence future decisions and actions (Drikx, 1998; Merizow, 1990). A recent study (Valentine, Nembhard, & Edmondson, 2015) identified and reviewed survey instruments used to assess teamwork, in this study they found 39 surveys that

measured teamwork and of these only 10 met all the criteria for psychometric validity. The most commonly assessed dimensions included communication, coordination and respect. However these questionnaires do not assess the readiness to collaborate or measure the motivators or threats to teamwork.

In order to improve the effectiveness of teams, there are several studies that have studied team training and its effects on team readiness. These studies (Buljac-Samardzic, et al, 2010; Salas, et al, 2008; Salazar, et al, 2012; Armstrong & Jackson-Smith, 2013) have used a variety of team-building activities and grant-writing activities to improve the team processes.

A comprehensive review of best practice for design and use of questionnaires by health service staff and patients was conducted by McColl et al (2001). In this review, they analyzed the questionnaire appearance, and they recommended that future studies determine the relative placement of headings, response category descriptors and codes. They also advocated studies on graphical methods (color contrasts and different typefaces) to aid in navigating the questionnaire. Format of instructions as well as vertical versus horizontal response formats for multiple questions are also recommended. These factors were related to either the questionnaire response rates, patterns of response to individual questions, item non-response rates and speed of response.

This study used a graphic presentation known as a keyform as a new way to present a questionnaire so that it can be self-scoring and easily interpreted by members of collaborative research teams. Keyforms can be derived from the logit calibrations of rating scale steps of items from Rasch analysis (Rasch, 1966). Keyforms visually locate item and rating scale calibrations (Linacre, 1997) and have been used in some health-related studies (Jette, 2007; Keilhofner, et al, 2000; Velozo & Woodbury, 2011). Figure 1 offers a preliminary visualization of the proposed

keyform based on a previous study (Mallinson, et al, 2016). MATRICx items are listed to the right of the figure in descending order of challenge (top to bottom). Items at the bottom are easier for participants to endorse than items at the top of the scale. The rating scale steps for each item (1, 2, 3, and 4) is to the left of the figure. The rating scale stair-steps from left to the right as items become more challenging. The rating scale steps for each item indicate the degree to which they represent readiness for collaboration. The measurement scale, based on logits, is located at the bottom of the figure. For example, for the least challenging item, "Collaboration enhances my understanding of what other disciplines do" the rating scale step 1, corresponds to -3.5 logits, rating scale step 2, corresponds to -1.5 logits and is interpreted as reflecting a greater readiness to collaborate. Logits are interpreted as an interval-level units of measurement that represents the log-odds ratio of the probability that an individual will endorse a MATRICx item using a particular rating scale step (Bond & Fox, 2008).

Keyforms are routinely used to portray student academic status in educational settings (Mead, 2009) but have been less frequently applied in health and research settings. Consequently, potential users of the MATRICx maybe unfamiliar with examining questionnaire results in this way. Therefore, the goal of this study is to develop a self-scoring form, the MATRICx Report Form, based on the keyform and to identify those features that enhance or detract conveying information about the level of motivation readiness for collaboration in team science. The following questions will be answered by our study.

1. What features do users report as enhancing their understanding and interpretation of the self-scoring form?

2. Which features do users report as needing revision and why? What additional features do users request?

3. How do potential users envision that they might utilize this MATRICx self-score form as they collaborate on a team science project?

Methods

Sample

The study was conducted in an academic institution in the area of the District of Columbia in 2016. The study participants included three faculty, one in the basic sciences and two in the health sciences. Institutional Review Board (IRB) approval was obtained for the participating sites prior to participant recruitment.

Using a purposive sample, participants all worked in academic institutions and had experience in collaborative team activities. We attempted to recruit people who had participated in earlier rounds of the MATRICx research project so that they could reflect on the differences between the original MATRICx questionnaire and the proposed new MATRICx Report Form. The participants were all female. They were asked prior to participating in the focus group discussion to familiarize themselves with the 55 items MATRICx questionnaire and the revised 17 items MATRICx Report Form.

Design

The philosophical assumptions and interpretive framework follows post-positivism (Creswell, 2013) because the underlying assumption is that improving the design of the questionnaire may bring about an improved experience in the response of the questionnaire.

There is a logical and cause-and-effect orientation in the assumption. This is phenomenological in approach (Creswell, 2013) because the main goal was to determine the process of answering the questionnaire and determining what features would have improved this experience. The key informant interviews were analyzed thematically (Braun & Clarke, 2006).

Data Collection Instruments

A discussion guide was developed based on a literature review and the objectives of the study. The discussion guide (see Appendix B) included an introduction and eight questions with a short closing statement. The questions were semi-structured to allow participants to express their thoughts while being guided to address the research questions.

Proposed MATRICx Report Form

Four versions of the proposed MATRICx Report Form were developed. Two different blank (unscored) Report Forms (Appendices C and D) included the graphical keyform and hypothetical descriptions on the level of collaboration readiness. Additional information included a box containing the descriptions of each level of collaboration and another box that suggested possible interventions for each level of collaboration (See Appendix C). Hypothetical cases were constructed of an experienced (Appendix E) respondent and an inexperienced (Appendix F) respondent.

The descriptors of the level of collaboration provided information corresponds to a continuum of level that could theoretically be based on markers (Trochim, et al, 2008) or antecedents and impacts (Hall, et al, 2008). The intervention box could provide information on the different intervention that might be appropriate for the individual based on the stage of collaborative readiness; studies have consistently shown that team training may be an effective intervention strategy (Buljac-Samardzic, et al, 2010; Salas, et al, 2008).

Procedure

A letter was sent out inviting the faculty and staff of a health science department in a District of Columbia university to participate in the study. Three participants agreed and key informant interviews were scheduled, as this approach was most feasible for the interviewees. Two detailed interviews were scheduled with each participant lasting about 45 minutes to one hour. One interview involved only one participant and the other had two participants. The primary author (JL) facilitated the interviews; additional observation and supervision during the interviews was provided by (LS).

During the interview, there was a short introduction on the purpose of the study, and participants were then were asked to verbally acknowledge their consent to the study. The conversations were captured in notes by the facilitator. These notes were later validated by the observer (LS). The original MATRICx questionnaire (Appendix G) was presented and then the two blank MATRICx Report Forms and the two completed MATRICx Report Forms were reviewed prior to the start of the interviews. During the interview and discussion, JL introduced the topics and after eliciting participants' initial feedback, a short explanation on the theoretical underpinnings of the questionnaire (Lotrrecchiano, et al, 2016; Mallinson, et al, 2016) and the research team's goal of making a self-scoring questionnaire was provided; after which the participants were invited to provide additional insights and feedback. This deliberative discussion, where explanation was made during the actual interview, was done because the innovative graphical presentation based on Rasch models was unfamiliar to participants; thus providing additional information supported the research participant responses (Rothwell, Anderson, & Botkin, 2016).

Data Analysis

Braun and Clarke (2006) thematic analytic method was used in analyzing the notes from the interviews. An inductive method was used in building up the themes from the notes. First, the notes were re-read several times by the first author to become familiar with the data. These notes taken during the initial interview by JL, were reviewed and validated by the observer (LS) who observed both interview sessions. Initial codes were generated and following several iterations of coding, four themes were generated.

Results

Four themes were identified: 1) Levels and skills are useful, 2) Report form is not intuitive, 3) Need for self-scoring instructions, and 4) Confusion in instructions and use. Theme 1 addressed Study Question 1 regarding features that could enhance understanding and interpretation. Themes 2 and 3 addressed Study Question 2 regarding features of the report form that need revision. Finally, Theme 4 address Study Question 3 regarding the utilization of the MATRICx report form in a team science project.

Features that Enhanced Understanding and Interpretation of the Report Form.

Theme 1. Levels and Skills are Useful.

"I liked the content and I liked the colors and layout."

"I would use the specific skills for successful collaboration."

"This could be used for mentoring and bringing people forward."

The participants stated that they liked the item content. They also liked the color palette and layout. A participant also imagined using this type of format to mentor people. One participant stated that "I would use the specific skills for successful collaboration. I liked that a lot." Another participant stated "I liked the content and I liked the colors and display."

Features of the Report Form Requiring Revision.

Theme 2. Report Form is Not Intuitive

"I have no idea what I'm supposed to do."

"I didn't realize the setup was hierarchical until (the other participant) mentioned it."

Using the Report Form seemed to be perplexing for the participants. Respondents reported difficulty in understanding how to use the entire Report Form both in terms of how it could be used to describe a person's readiness for collaboration and how the suggested interventions could be applied.They did not realize that Item Box (keyform), Descriptor Level and Suggested Intervention boxes could all be related. For example, they did not understand that the level of readiness for collaboration identified from the MATRICx items could then used to determine the suggested intervention in improving the readiness to collaborate.

With regards to the Item Box (keyform), only one of the participants recognized that the items were arranged hierarchically, with items at the top indicating greater challenge.

Even though they found the Report Form difficult to understand, two of the participants were able to correctly identify which of the hypothetical cases were "experienced" and "inexperienced". However, one of the participants simply said "It's a completed diagram, circle some numbers. I have no idea what I'm supposed to do."

Theme 3 . Need for Self-Scoring Instructions.

"How do I know I'm at this level?"

"A total score might have been helpful."

"Did you just eyeball it and you (facilitator) came up with a number (the level of participation)?"

"I just need more instructions."

Determining the level of readiness for collaboration was a focal point for much of the discussion. Participants repeatedly asked for more detailed instructions about how to use the form to determine the level of collaboration. One participant further reinforced the need for self-scoring instructions by stating that how the level of motivation readiness was arrived at was not clear. This respondent noted that use of a score transformation would be useful before the actual the intervention boxes containing the level descriptors and intervention. This respondent also noted that "There are no instructions so I do not know what to do."

The participants pointed out features that could improve the way the questionnaire was presented. In this theme, two participants pointed out a positive a aspect of the questionnaire "I really liked the content." and specific suggestions such as "A total score would help."

Envisioning a Revised MATRICx Report Form.

Theme 4. Confusion in Instructions and Use.

"I think this, this is confusing."

"NSQE is not necessarily the same as the Likert numbers 1 to 4."

"Putting a label on the bottom."

"I did not understand what -4 to 4 was lining up to."

"Percentile, was not standard."

All three participants mentioned that they would like to see a revised MATRICx Report Form and see how it could potentially be used. The placement and use of logits on the top and bottom of the keyform was not intuitive these participants. The use of percentile scores alongside the logit measures also resulted in confusion. They described both the label for the logit measures (-4 to 4) and percentile to be confusing. One participant asked for an explanation of the numbers and how they could be used. After an explanation was provided, a participant said that

it helped; but added "I just need more instructions". In general, participants requested more and clearer labels and requested that instructions for using the form be written directly on the form.

Discussion

This study examined the extent to which a graphical representation of the MATRICX items helped inform potential users about interpreting scores with regards to readiness for collaboration. Overall, the participants found the content of the MATRICx informative but found the presentation confusing and not intuitive. Labeling to clearly orient users to the purpose of the form and short, clear instructions added to the form were recommended revisions.

Features that enhanced understanding and interpretation.

The participants noted that the content of the questionnaire enhanced the understanding and interpretation of the MATRICx report form. For example, the items could be viewed as specific skills that could be used in mentorship and successful collaboration. This reinforces the content validity of the MATRICx that has been found in previous studies (Lotrecchiano, et al, 2015; Mallinson, et al, 2016).

Features requiring revision.

Several studies have researched the keyform format (Jette, 2007; Velozo & Woodbury, 2011, Wang, Hart, Stratford & Mioduski, 2009) and have described in depth the theoretical as well as practical application of the format. These studies were all conducted with researchers and professionals who had a working understanding of the Rasch model. While other research might indicate that the keyform format is intuitive, this study suggests that participants who are naïve to this kind of approach find the format confusing and not intuitive. A participant whose specialty was in the basic sciences did not understand what was expected to be done with the report form.

McColl et al (2001) performed an extensive review of literature on the design and use of a questionnaire and a review of best practices within the health services, and they concluded that questionnaire appearance can reduce coding responses and minimize potential inter-rater variability. They argued that there is a need to understand the application of spatial arrangement of information as well as color and brightness. Participants in this study cited the placement of legends and labels had negatively affected their understanding of the report form.

The participants emphasized the need for detailed self-scoring instructions and further enhancements to the level of collaboration and suggested interventions. The participants wanted to find out if total scores or some other method could be used to determine the readiness to collaborate among those who answered the questionnaire.

Envisioning a revised MATRICx Report Form

This study suggests that the MATRICx Report Form could be reformatted with a more transparent self-scoring system to improve the interpretation of the level of readiness to collaborate. The participants noted problems but also reported seeing the value in a revised MATRICx Report Form not only as part of the research study but as something to be used for their own needs. Overall, the study revealed that there is a need for clear self-scoring instructions on the report form.

Recommendation

A revised format for the MATRICx report form is provided in Figure 2. The participants suggested a total score method. The use of a raw score-to-measure table is one option that could be explored. In addition, rescaling logits to a 0-100 range would likely be more informative for users (Wright & Stone, 1979). Using the rescaled score to correspond to the proposed level of readiness to collaborate could be informative. The level of readiness to collaborate could also be

more clearly linked to the proposed intervention that might be helpful. These two factors, readiness to collaborate and educational interventions, could be color coded, to indicate to users consistency and alignment of meaning across the report form. A legend that describes the rating scale responses should be displayed more prominently.

Revised instructions should included both a detailed explanation on how to perform the self-scoring method and also clearly way link the MATRICx score with the suggested interventions. Folloiwng these revisions, a second round of interviews or focus group discussion would be beneficial in further advancing the understanding of the use and presentation of the revised MATRICx Report Form (Figure 2).

Limitations

The study undertook only two interviews with three respondents. Our panel of interviewees all had doctoral levels of education. Participants who had varying educational levels might have provided different insights into the experience on the use of the MATRICx Report Form.

Conclusion

This study provides insight into the use of a self-scoring questionnaire in the keyform format. It suggests that this different format may be initially confusing to users and that clear instructions on how to self-score, as well as use the new format, is needed for it to be useful for application in team science collaborations.

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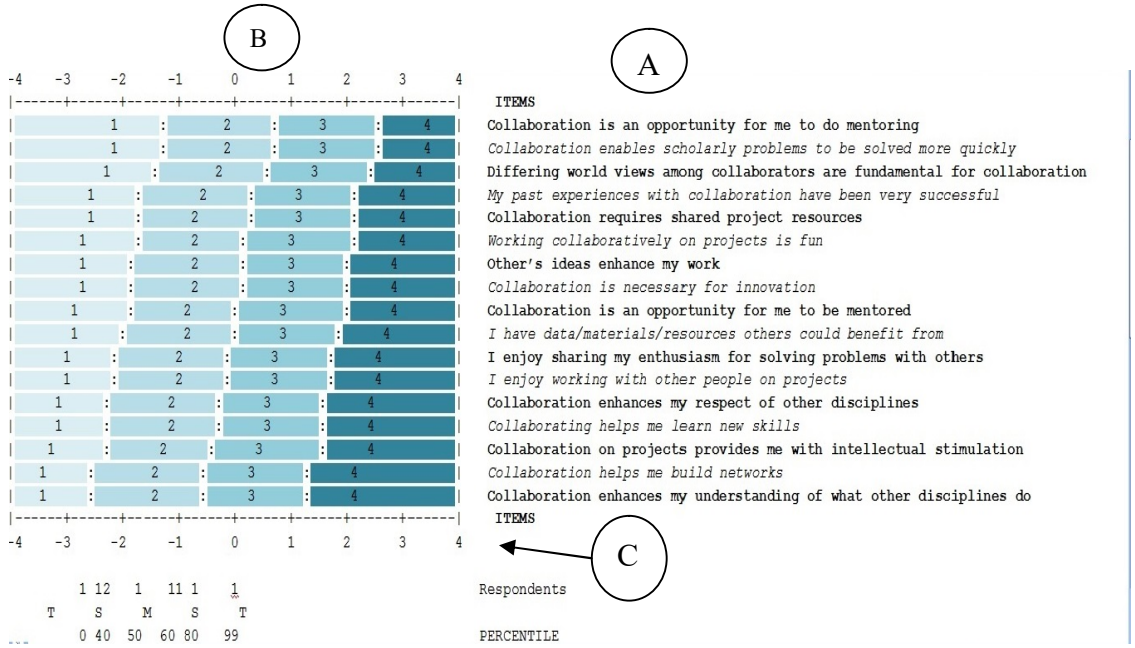
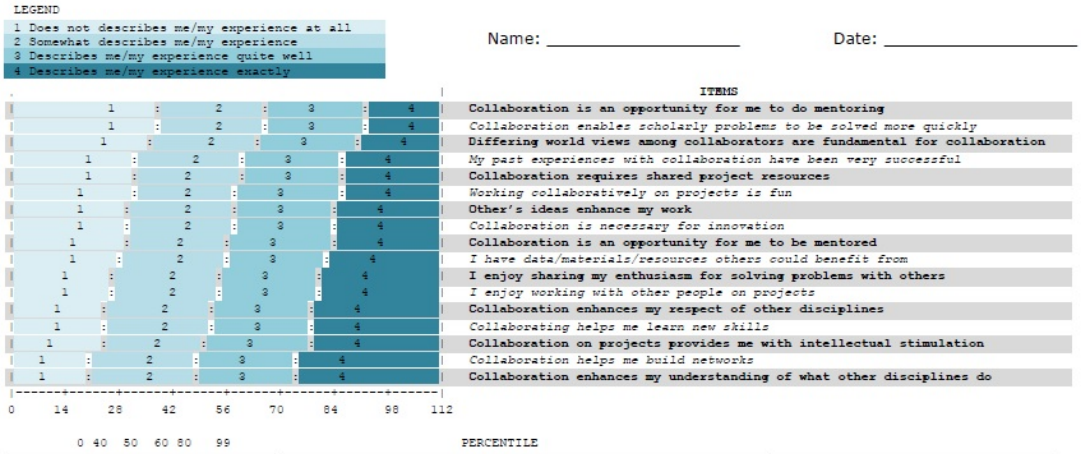


Figure 1. Sample keyform derived from Mallinson et al (2016). A. Items. B. Rating Scale. C. Measurement Scale (in logits).

Motivation Assessment for Team Readiness, Integration, and Collaboration (MATRICx) Report Form

Instructions: Encircle the most appropriate number that describes you best. Total the score. Find the score that matches your Level of Readiness to Collaborate and the Suggested Intervention which might prove to be useful.



Score Table		Level of Readiness to Collaborate (Trochim, et al, 2008; Hall, et al, 2008)	Suggested Intervention (Bujac-Samardzic, et al, 2010; Salas, et al, 2008)
Total Score	Rescaled Score		
17 - 34	0 - 42	**Near-term Markers: Collaborative Readiness** Environmental, intrapersonal, interpersonal factors. The near-term markers emphasize the immediate outcomes. It includes the training, collaboration, and transdisciplinary integration. Management-related issues such as financial analysis of expenditures and carryover are included.	Competencies
35 - 52	43 - 62	**Intermediate Markers: Collaborative Capacity** Dynamic processes and near-term outcomes. Intermediate markers include the ability to improve in the publication and communication of the team. The knowledge in science in terms of methodology as well as communication of research findings were part of this markers.	Case Studies
53 - 68	63 - 100	**Long-term Markers: Collaborative Products** Scientific, training, policy and health outcomes. Long-term markers includes policy and practice and ultimately health outcomes.	Team Training

Figure 2. Revised MATRICx Report Form.

Appendix A.

Letter of Invitation for Interview.

Dear Colleague:

Over the past year, you were asked to participate in a GW research study that involved development of an instrument, the **Motivation Assessment for Team Readiness, Integration, and Collaboration (MATRICx)**. Due to the participation of many volunteers, our research team has published a number of articles regarding our work, and more are in preparation:

Lotrecchiano, GR, Mallinson, TR, Leblanc-Beaudoin, T, Schwartz, LS, Lazar, D, and Falk-Krzesinkski, HJ (2016). Individual motivation and threat indicators of collaboration readiness in scientific knowledge producing teams: a scoping review and domain analysis. *Heliyon*. Volume 2, Issue 5, Article e00105.

Mallinson, T., Lotrecchiano, G., Schwartz, L., Furniss, J., Leblanc-Beaudoin, T., Lazar, D. Falk-Krzesinski, H. (2016). Pilot analysis of the Motivation Assessment for Team Readiness, Integration, and Collaboration (MATRICx) using Rasch Analysis. *J Investig Med* Published Online First: July 8, 2016. doi:10.1136/jim-2016-000173

We are now moving into the next phase of our research project, development of a **self-scoring MATRICx,** and would greatly appreciate your participation in a focus group so that we may gain your insight into its format, overall experience completing it, and potential uses, among other areas.

If you are interested in participating in a focus group, please complete the following short survey by **Monday, August 1** and a member of our research team will be in touch soon: https://goo.gl/forms/1dBnoNshHJ9Lz3pq2

Sincerely,

The MATRICx Team

Appendix B.
Interview Questions.

MATRICx Report Form Focus Group Discussion Guide Question

Introduction

Welcome and thank you for volunteering to take part in this focus group discussion on the self-scoring format of the Motivation Assessment for Team Readiness, Integration and Collaboration (known as the MATRICx) or the MATRICx Report Form. You have been asked to participate as we value your point of view and are looking to you to help us with making decisions about what will be the best output and usefulness of the information the MATRICx communicates.

Introduction: My name is John Liu, a graduate student and research assistant to the MATRICx research team working with Drs. Lotrecchiano, Mallinson, and Schwartz. I will be facilitating this focus group. The goal of this focus group is to get your reaction to different graphical ways of presenting MATRICx scores. We are interested in understanding how to make the MATRICx useful to users like yourselves. We want to understand which elements of the graphics are useful or not so useful and how they might be revised and improved for future use.

Warm-up: As a warm-up, I'd like everyone to introduce themselves. You may or may not wish to share your name, it is not important to our data collection?

Anonymity: This is a confidential discussion and anything discussed will remain anonymous in our notes and assessment. While I will be taking notes, there will be no identifying markers. In addition, we would like to protect everyone involved in the group by asking you to consent to confidentiality by responding one-by-one with the phrase “I will keep all content of this conversation confidential”

[ask each participant to say so]

Outline: Earlier this week, we provided you with the files that we will be using for today's focus group discussion. We will first take a look at these files again as a group, which I have labeled File 1 to File 4. We will take a few minutes to review the files before we proceed to the discussion. So let us go and review the four files that I have previously mentioned. File 1 and 2 refers to blank MATRICx Report Forms. While Files 3 and 4 are completed profiles of the MATRICx Report Forms hypothetically constructed from real persons.

Guiding Questions

1) How did you find this format (the blank MATRICx Report Form, File 1 and File 2) different from the format of the MATRICx survey you have taken in terms of layout, graphical display and information provided? Do you think it is a better arrangement, not better or simply different?

2) Between the two MATRICx Report Forms (File 1 and File 2), what features (elements such as color palette and display format) did you find useful or attractive? Or not useful or distracting?

Please feel free to offer any suggestions or improvements about how the Report Forms might better communicate the information from the MATRICx.

3) Using the MATRICx Report Form what information regarding readiness to collaborate did you finding interesting , meaningful, or maybe even perplexing? Are there any new insights that you think might be useful which were not included in the MATRICx Report Form that you hoped you might be able to ascertain?

4) We had provided two completed MATRICx Report Forms, labeled File 3 and File 4. These are hypothetical profiles from our users that we have constructed. Using our completed Files, can you describe which of these Files describes someone who is more experienced with collaboration as opposed to someone who is less experienced with collaboration. Was the MATRICx Report Form intuitive in helping you determine who might be more ready to collaborate as opposed to someone who was less ready?

5) How might the information that you gather from the MATRICx Report Form be used in teams to increase the understanding of the person's ability and 'possible' readiness to collaborate? Do you believe the information provided to be useful and informative in improving one's ability to understand the determine the readiness to collaborate both for yourself and in understanding how ready another person is in collaboration?

6) In your opinion, how might this Report Form help problem solving teams and person's entering into these types of teams maximize their effectiveness.

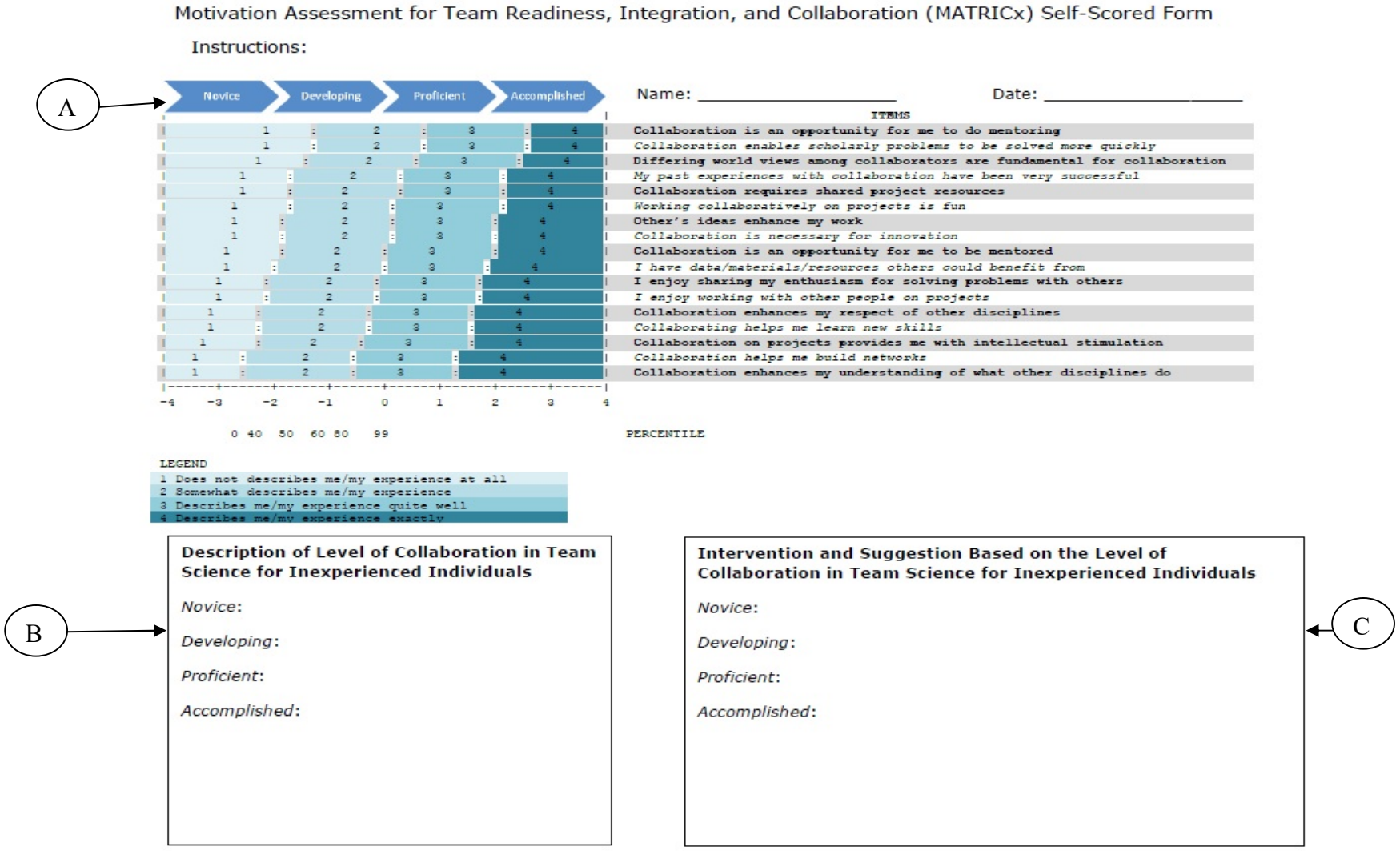
7) Can you let us know what our overall experience regarding the use of the MATRICx Report Form compared to the original format disregarding the difference in length of the questionnaire.

8) Finally, is there anything else you would like to say about the MATRICx, its Report Form, or its potential for increasing effectiveness in team collaborations.

Closing

Thank you again for participating in this discussion. Do you have any questions for me regarding the discussion before we leave. If not, I wish everyone a happy weekend.

Appendix C.
Proposed MATRICx Report Blank Form 1.



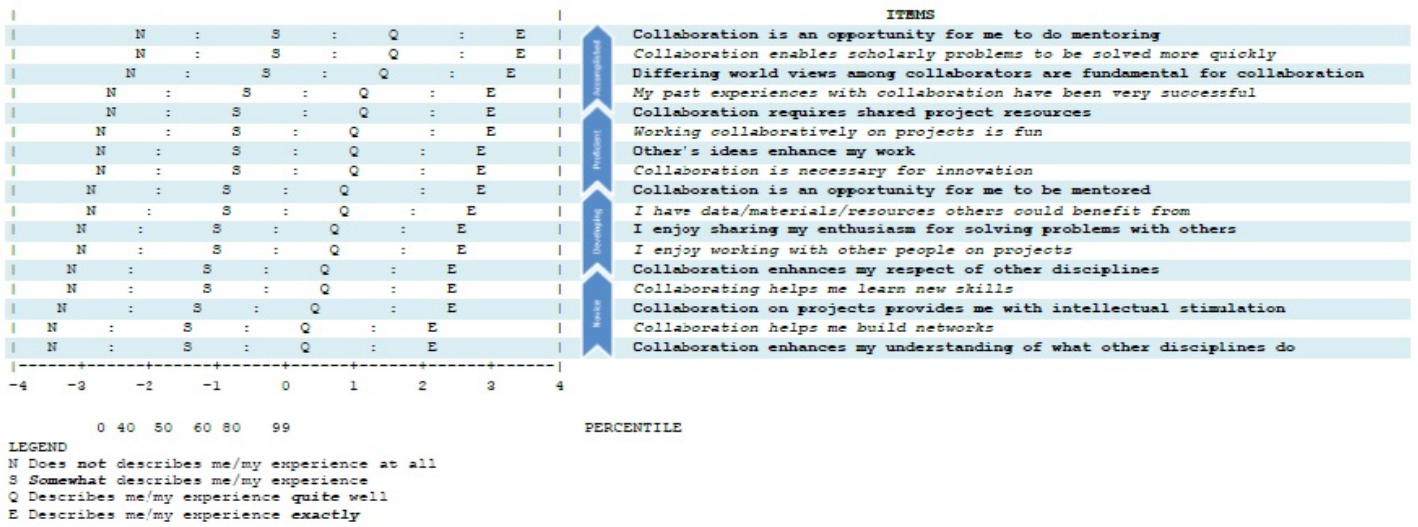
A. Level of Descriptor on the Item Box. B. Descriptor Box. C. Intervention Box.

Appendix D.
Proposed MATRICx Report Blank Form 2.

Motivation Assessment for Team Readiness, Integration, and Collaboration (MATRICx) Self-Scored Form

Instructions:

Name: _____ Date: _____



LEGEND
N Does **not** describes me/my experience at all
S ***Somewhat*** describes me/my experience
Q Describes me/my experience **quite** well
E Describes me/my experience **exactly**

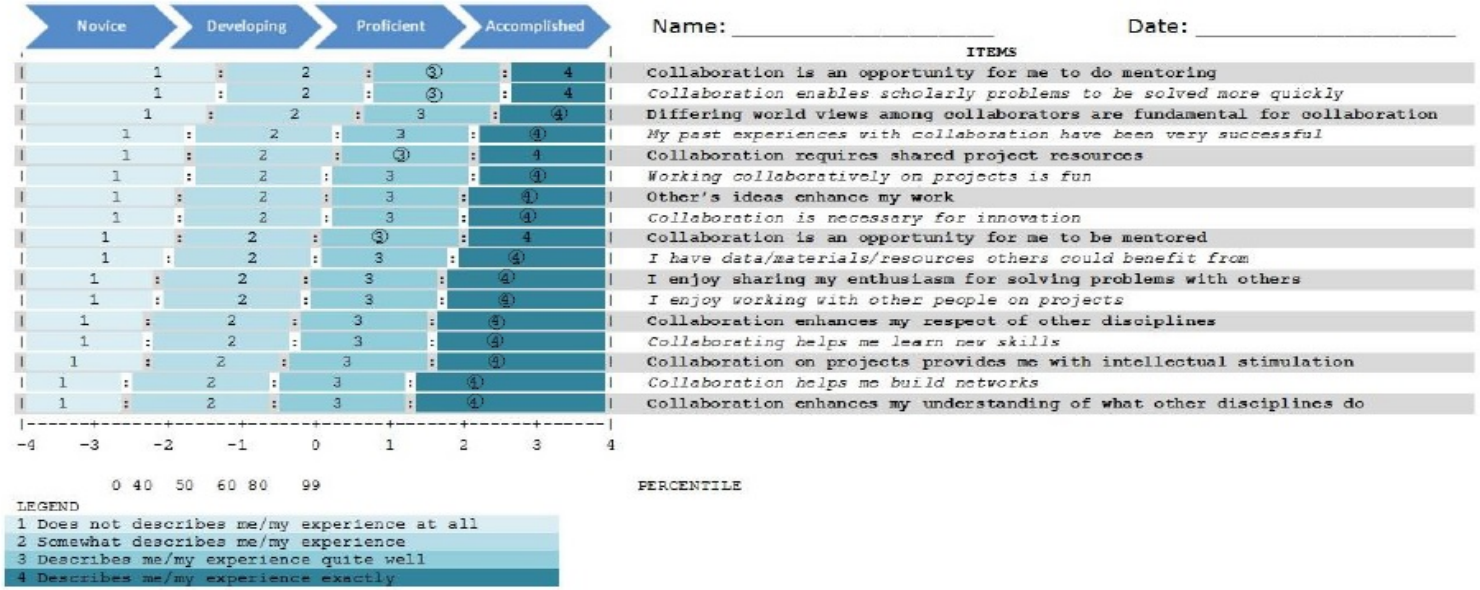
Description of Level of Collaboration in Team Science for Respondents	**Intervention and Suggestion Based on the Level of Collaboration in Team Science for Respondents**
Novice:	*Novice*:
Developing:	*Developing*:
Proficient:	*Proficient*:
Accomplished:	*Accomplished*:

Appendix E.

Completed MATRICx Report Blank For Hypothetical Experienced User.

Motivation Assessment for Team Readiness, Integration, and Collaboration (MATRICx) Self-Scored Form

Instructions:



Description of Readiness of Collaboration in Team Science for Respondents

Novice:

Developing:

Proficient:

Accomplished:

Intervention and Suggestion Based on the Readiness of Collaboration in Team Science for Respondents

Novice:

Developing:

Proficient:

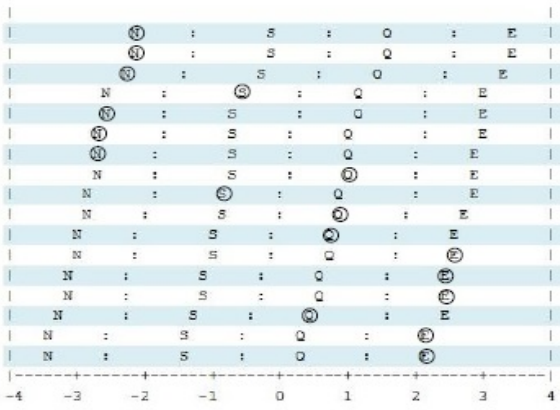
Accomplished:

Appendix F.
Completed MATRICx Report Blank For Hypothetical Experienced User.

Motivation Assessment for Team Readiness, Integration, and Collaboration (MATRICx) Self-Scored Form

Instructions:

Name: _____ Date: _____



	ITEMS
Accomplished	Collaboration is an opportunity for me to do mentoring
	Collaboration enables scholarly problems to be solved more quickly
	Differing world views among collaborators are fundamental for collaboration
	My past experiences with collaboration have been very successful
Proficient	Collaboration requires shared project resources
	Working collaboratively on projects is fun
	Other's ideas enhance my work
	Collaboration is necessary for innovation
Developing	Collaboration is an opportunity for me to be mentored
	I have data/materials/resources others could benefit from
	I enjoy sharing my enthusiasm for solving problems with others
	I enjoy working with other people on projects
Novice	Collaboration enhances my respect of other disciplines
	Collaborating helps me learn new skills
	Collaboration on projects provides me with intellectual stimulation
	Collaboration helps me build networks
	Collaboration enhances my understanding of what other disciplines do

LEGEND
N Does *not* describes me/my experience at all
S *Somewhat* describes me/my experience
Q Describes me/my experience *quite* well
E Describes me/my experience ***exactly***

Description of Level of Collaboration in Team Science for Respondents
Novice:
Developing:
Proficient:
Accomplished:

Intervention and Suggestion Based on the Level of Collaboration in Team Science for Respondents
Novice:
Developing:
Proficient:
Accomplished:

Appendix H.
Original MATRICx Questionnaire.

Confidential

MATRICx - Motivation Assessment for Team Readiness, Integration, and Collaboration

You are invited to participate in a research study under the direction of Dr. Gaetano R. Lotrecchiano EdD, PhD of the Department of Clinical Research and Leadership, George Washington University (GWU), and paid for by School of Medicine and Health Sciences. Taking part in this research is entirely voluntary. Your academic standing or the status of your employment will not, in any way, be affected should you choose not to participate or if you decide to withdraw from the study at any time. The purpose of this study is to evaluate the reliability and validity of the self-reported motivators and deterrents to team engagement found in the Motivation Assessment for Team Readiness, Integration, and Collaboration (MATRICx) survey.

If you choose to take part in this study, you will be asked to complete the attached survey and return it to the research coordinator. The total amount of time you will spend in connection with this study is 15-30 minutes to complete the survey. You may refuse to answer any of the questions and you may stop your participation in this study at any time. If you choose to complete the survey you may be asked by the study team to participate in an interview to discuss your answers and the usability of the survey.

Possible risks or discomforts you could experience during this study include: loss of confidentiality of psychological stress. You will not benefit directly from your participation in the study. The benefits to science and humankind that might result from this study are: A better understanding of the usefulness of this survey and its potential for use during research that tries to understand motivators and deterrents to team collaboration. Every effort will be made to keep your information confidential, however, this cannot be guaranteed. The survey is anonymous and your name will not be included on the survey. However, you may be identified through email communications or one-on-one contact with the researchers. In these cases only the research team will be aware of your connection with the study. If results of this research study are reported in journals or at scientific meetings, the people who participated in this study will not be named or identified.

The Office of Human Research of George Washington University, at telephone number (202) 994-2715, can provide further information about your rights as a research participant. Further information regarding this study may be obtained by contacting Dr. Gaetano R. Lotrecchiano, Principal Investigator, at telephone number (202) 994-9855. Your willingness to participate in this research study is implied if you proceed with completing the survey/interview. *Please keep a copy of this document in case you want to read it again.

For each of the statements below, indicate how well each one describes you and/or your experience with collaborative group projects:

	Describes me/my experience exactly	Describes me/my experience quite well	Describes me/my experience somewhat	Describes me/my experience not at all
Other's ideas enhance my work	○	○	○	○
It is difficult to explain the value of my work to others	○	○	○	○
I like to lead my own projects	○	○	○	○
In group projects, I worry that others will dismiss my ideas	○	○	○	○
I prefer to compete my ideas against the ideas of others	○	○	○	○
Collaboration is an opportunity for me to be mentored	○	○	○	○

Appendix H.
Winstep Output of Score to Table.

```
TABLE 20.1 MATRICx Data Clas                    ZOU814WS.TXT  Aug 28 2016 21:25
INPUT: 9 Respondents  55 Items  REPORTED: 9 Respondents  17 Items  4 CATS WINSTEPS 3.91.2
-------------------------------------------------------------------------------------

                      TABLE OF MEASURES ON TEST OF 17 Items
-------------------------------------------------------------------------------
| SCORE  MEASURE    S.E. | SCORE  MEASURE    S.E. | SCORE  MEASURE    S.E. |
|------------------------+------------------------+------------------------|
|    17   -37.36E  16.03 |    35    -3.47    2.10 |    53     5.08    2.23 |
|    18   -26.96    8.67 |    36    -2.98    2.07 |    54     5.65    2.28 |
|    19   -21.13    6.04 |    37    -2.50    2.05 |    55     6.26    2.35 |
|    20   -17.82    4.88 |    38    -2.03    2.03 |    56     6.90    2.43 |
|    21   -15.51    4.19 |    39    -1.57    2.01 |    57     7.60    2.52 |
|    22   -13.75    3.72 |    40    -1.11    2.00 |    58     8.35    2.63 |
|    23   -12.32    3.39 |    41     -.66    1.99 |    59     9.17    2.76 |
|    24   -11.12    3.13 |    42     -.21    1.99 |    60    10.09    2.92 |
|    25   -10.09    2.93 |    43      .23    1.99 |    61    11.12    3.12 |
|    26    -9.17    2.77 |    44      .68    1.99 |    62    12.31    3.38 |
|    27    -8.34    2.64 |    45     1.13    2.00 |    63    13.73    3.71 |
|    28    -7.59    2.52 |    46     1.59    2.01 |    64    15.49    4.18 |
|    29    -6.89    2.43 |    47     2.05    2.03 |    65    17.78    4.87 |
|    30    -6.25    2.35 |    48     2.52    2.05 |    66    21.08    6.03 |
|    31    -5.64    2.29 |    49     3.00    2.07 |    67    26.89    8.66 |
|    32    -5.06    2.23 |    50     3.49    2.10 |    68    37.28E  16.02 |
|    33    -4.51    2.18 |    51     4.00    2.14 |                        |
|    34    -3.98    2.14 |    52     4.53    2.18 |                        |
-------------------------------------------------------------------------------
CURRENT VALUES, UIMEAN=50.3754 USCALE=8.8284
TO SET MEASURE RANGE AS 0-100, UIMEAN=117.5467 USCALE=11.8282
TO SET MEASURE RANGE TO MATCH RAW SCORE RANGE, UIMEAN=76.9488 USCALE=6.0324
Predicting Score from Measure: Score = Measure * 1.1133 + 25.5002
Predicting Measure from Score: Measure = Score * .7821 + -19.9428
Statistically different levels of performance = 4.3 Reliability of levels = .95
```

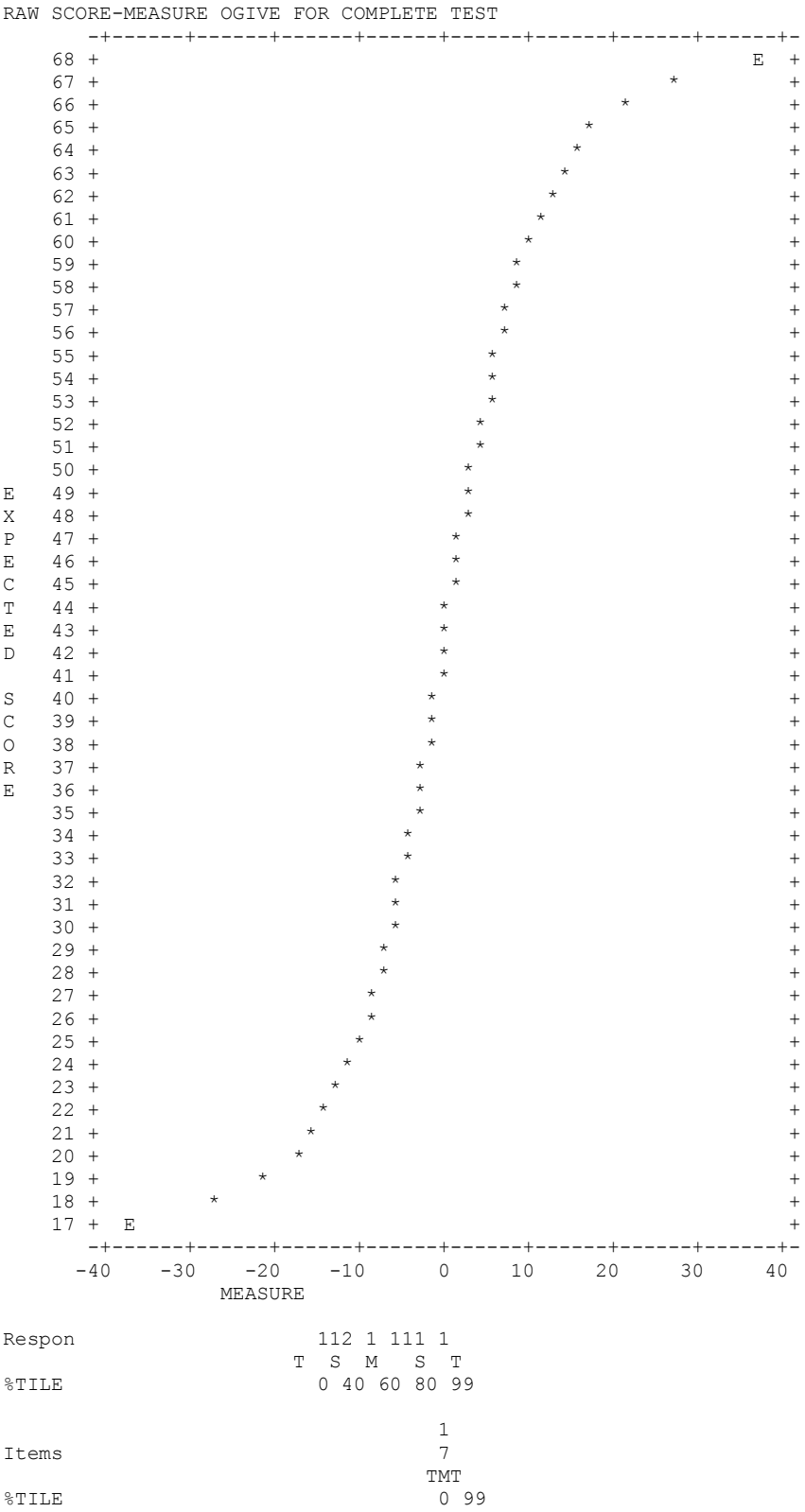

RAW SCORE-MEASURE OGIVE FOR COMPLETE TEST
EXPECTED SCORE
MEASURE
-40 -30 -20 -10 0 10 20 30 40
Respon 112 1 111 1
T S M S T
%TILE 0 40 60 80 99
Items 1 7
TMT
%TILE 0 99

TABLE 20.2 MATRICx Data Clas ZOU814WS.TXT Aug 28 2016 21:25
INPUT: 9 Respondents 55 Items REPORTED: 9 Respondents 17 Items 4 CATS WINSTEPS 3.91.2

TABLE OF SAMPLE NORMS (500/100) AND FREQUENCIES CORRESPONDING TO COMPLETE TEST

SCORE	MEASURE	S.E.	NORMED	S.E.	FREQUENCY	%	CUM.FREQ.	%	PERCENTILE
17	-37.36E	16.03	-178	368	0	.0	0	.0	0
18	-26.96	8.67	61	199	0	.0	0	.0	0
19	-21.13	6.04	195	139	0	.0	0	.0	0
20	-17.82	4.88	271	112	0	.0	0	.0	0
21	-15.51	4.19	324	96	0	.0	0	.0	0
22	-13.75	3.72	365	86	1	11.1	1	11.1	6
23	-12.32	3.39	398	78	1	11.1	2	22.2	17
24	-11.12	3.13	425	72	2	22.2	4	44.4	33
25	-10.09	2.93	449	67	0	.0	4	44.4	44
26	-9.17	2.77	470	64	0	.0	4	44.4	44
27	-8.34	2.64	489	61	1	11.1	5	55.6	50
28	-7.59	2.52	506	58	0	.0	5	55.6	56
29	-6.89	2.43	522	56	0	.0	5	55.6	56
30	-6.25	2.35	537	54	0	.0	5	55.6	56
31	-5.64	2.29	551	53	1	11.1	6	66.7	61
32	-5.06	2.23	564	51	0	.0	6	66.7	67
33	-4.51	2.18	577	50	1	11.1	7	77.8	72
34	-3.98	2.14	589	49	0	.0	7	77.8	78
35	-3.47	2.10	601	48	1	11.1	8	88.9	83
36	-2.98	2.07	612	48	0	.0	8	88.9	89
37	-2.50	2.05	623	47	0	.0	8	88.9	89
38	-2.03	2.03	634	47	0	.0	8	88.9	89
39	-1.57	2.01	645	46	0	.0	8	88.9	89
40	-1.11	2.00	655	46	0	.0	8	88.9	89
41	-.66	1.99	666	46	0	.0	8	88.9	89
42	-.21	1.99	676	46	1	11.1	9	100.0	94
43	.23	1.99	686	46	0	.0	9	100.0	100
44	.68	1.99	696	46	0	.0	9	100.0	100
45	1.13	2.00	707	46	0	.0	9	100.0	100
46	1.59	2.01	717	46	0	.0	9	100.0	100
47	2.05	2.03	728	47	0	.0	9	100.0	100
48	2.52	2.05	739	47	0	.0	9	100.0	100
49	3.00	2.07	750	48	0	.0	9	100.0	100
50	3.49	2.10	761	48	0	.0	9	100.0	100
51	4.00	2.14	773	49	0	.0	9	100.0	100
52	4.53	2.18	785	50	0	.0	9	100.0	100
53	5.08	2.23	797	51	0	.0	9	100.0	100
54	5.65	2.28	811	52	0	.0	9	100.0	100
55	6.26	2.35	825	54	0	.0	9	100.0	100
56	6.90	2.43	839	56	0	.0	9	100.0	100
57	7.60	2.52	855	58	0	.0	9	100.0	100
58	8.35	2.63	873	60	0	.0	9	100.0	100
59	9.17	2.76	891	63	0	.0	9	100.0	100
60	10.09	2.92	912	67	0	.0	9	100.0	100
61	11.12	3.12	936	72	0	.0	9	100.0	100
62	12.31	3.38	964	78	0	.0	9	100.0	100
63	13.73	3.71	996	85	0	.0	9	100.0	100
64	15.49	4.18	1037	96	0	.0	9	100.0	100
65	17.78	4.87	1089	112	0	.0	9	100.0	100
66	21.08	6.03	1165	139	0	.0	9	100.0	100
67	26.89	8.66	1299	199	0	.0	9	100.0	100
68	37.28E	16.02	1537	368	0	.0	9	100.0	100

THE NORMED SCALE IS EQUIVALENT TO UIMEAN= 680.7010 USCALE= 22.9778