

D1.2 Rwandan Cultural Knowledge

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Responsible Person: **E. Birhan**

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PU	Public	PU
PP	Restricted to other programme participants (including Afretec Administration)	
RE	Restricted to a group specified by the consortium (including Afretec Administration)	
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Executive Summary

Deliverable D1.2 comprises a compendium of population-based cultural knowledge regarding behaviors, activities, actions, and movements that are either culturally sensitive or insensitive. This knowledge is used to specify the culturally sensitive African modes of social interaction in Deliverable D1.3 and the Africa-centric design patterns in Deliverable D1.4. It will be formalized in the cultural knowledge ontology and knowledge base in Deliverable D5.4.1. The cultural knowledge has been gathered by developing a detailed questionnaire and using it to survey a cross-section of Rwandan citizens. The survey is available online and a pilot survey has been completed. The Kinyarwanda version is [here](#) and the English version is [here](#).

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1 Introduction

This report is a compilation of the culture-specific knowledge that is needed to achieve culturally-sensitive human robot interaction between robots and Rwandan people. The goal is to capture the subtleties of verbal and non-verbal communication, such as appropriate greeting gestures and eye contact norms in various social contexts. To acquire this knowledge, we surveyed a representative cross-section of Rwandan citizens, focussing on human-human interaction, rather than human-robot interaction. This approach was adopted to avoid introducing the concept of social robots — a concept that might not be familiar to all participants in the survey — when canvassing their views. The canvassing exercise was conducted using the questionnaire in Appendix I (English) and Appendix II (Kinyarwanda). The survey is available online. The Kinyarwanda version is available [here](#) and the English version is available [here](#).

Based on the consensus answers to the questions in the survey, this report presents a compendium of population-based cultural knowledge regarding behaviours, activities, actions, and movements¹ that are either culturally sensitive or culturally insensitive, i.e., Rwandan cultural knowledge for polite and respectful interaction. This knowledge provides input to Task 1.3 African Modes of Social Interaction, Task 1.4 Africa-centric Design Patterns, and, in particular, to Task 5.4.1 Cultural Knowledge Ontology & Knowledge Base.

2 Survey Methodology

The CSSR4Africa project focuses on an ethnographic study of cultural knowledge in Rwanda and South Africa, with the first phase concentrating on a detailed survey of Rwandan culture. The survey follows a systematic process: developing an initial knowledge ontology to structure the questionnaire, formulating questions to elicit knowledge in each category, designing and implementing data collection methods and response visualization tools, conducting the survey, validating the responses, and extracting consensus perspectives in the responses to each of the questions. This knowledge will be used to construct a comprehensive cultural knowledge database, as reported in Deliverable D5.4.1.

2.1 Cultural Knowledge Ontology

The ontology, also described in Deliverable D5.4.1, comprises three parts corresponding to spatial interaction, verbal interaction, and non-verbal interaction. Each part comprises specific elements of cultural norms and behaviors. For example, spatial interaction includes distance and positioning, while non-verbal interaction includes eye contact, facial expressions, and hand movements. Verbal interaction covers aspects like word choice, voice tone, and conversation turn-taking. This ontology served as a guide for developing the culturally knowledge questionnaire, ensuring all important areas of interaction are covered. By mapping out these cultural elements, the ontology makes sure that important aspects of Rwandan social norms are fully addressed in the data collection. The cultural knowledge base, also described in Deliverable D5.4.1, that will be created from the survey results will be organized using this ontology. This will provide a well-structured and complete resource for future work on culturally appropriate social robots in Rwanda.

¹We define a behavior as a pattern of activity, an activity as a sequence of actions, an action as a goal-directed sequence of motions, and a motion as a change in effector pose, subject to constraints, e.g., trajectory or biological velocity and acceleration profile.

2.2 Questionnaire Development

The development of the survey questionnaire followed several steps: surveying the literature, drafting questions, and finalizing the questionnaire based on the cultural knowledge ontology. We reviewed relevant studies on cultural competence in robotics and cross-cultural communication to inform our approach, breaking down our main research objective into sub-objectives focusing on spatial interaction norms, verbal communication patterns, and non-verbal cues in Rwandan culture. The process involved brainstorming sessions, reviews, and validation using a checklist from [1]. The resulting bilingual questionnaire in English and Kinyarwanda comprises three parts: (1) personal information for demographic balance, (2) validation of previously gathered cultural knowledge from a preliminary survey of 23 people from eight African countries [2], and (3) identification of culturally sensitive and disrespectful behaviors. This approach allows us to confirm and refine our understanding of Rwandan cultural norms within the broader context of African cultural knowledge.

2.3 Collection Methods and Ethical Considerations

The study balances effective data collection with ethical research practices. We identified the study population primarily from Kigali city, chosen for relevant characteristics, cost-effectiveness, and logistical support. Participants aged 18-65, speaking English and Kinyarwanda, were selected using purposive sampling. Data collection sites included university campuses, markets, and cafeterias to ensure diverse representation. Throughout this process, ethical considerations were paramount. We obtained informed consent, maintained anonymity and confidentiality, and designed the survey so that it itself is culturally sensitive. A local research team reviewed questions to avoid offensive content, and all necessary university authorization processes were followed during the piloting phase. This approach ensured research integrity while respecting participants' rights and cultural sensitivities, creating a foundation for robust and ethically sound data collection.

2-1	To show respect, one should lower gaze when greeting someone older.
2-2	One should suspend work or movements and pay attention when addressed.
2-3	One should keep intermittent eye contact; lack of eye contact depicts disrespect as it shows divided attention during the interaction.
2-4	One should not make persistent eye contact with an older person.
2-5	One should not make eye contact when being corrected by someone.
2-6	One should use an open palm of the hand to point to people and objects.
2-7	One should not point an upward facing palm of the hand at someone.
2-8	One should not use the left hand to point to anything.
2-9	To show respect, one should bow slightly when greeting someone older.
2-10	To show respect, one should raise both hands when greeting.
2-11	One should not wave at someone from a distance; one should move towards them to greet them.
2-12	One should not use the left hand to hand something to someone.
2-13	To show respect, one should hand over and accept gifts with two hands and do so from the front, facing the recipient.
2-14	To show respect, one should shake hands with the right hand and use the left arm to support the right forearm when doing so.
2-15	An appreciation of rhythmic sound and movement is valued.
2-16	To show respect, one should bow slightly and lower gaze when greeting someone older.
2-17	The younger interaction partner should bow when greeting an older person or when rendering a service.
2-18	All interactions should begin with a courteous greeting.
2-19	The younger interaction partner should enable a greeting to be initiated by an older person.
2-20	It is respectful to use local languages and they should be used for verbal interaction when possible.
2-21	One should use formal titles when addressing someone.
2-22	One should engage in a preamble before getting to the point, as being too forward may be regarded as disrespectful.
2-23	One should not interrupt or talk over someone when they are speaking.
2-24	One should not talk loudly to an older person.
2-25	Behaviours should focus on fostering social connections and relationships; they should not be purely functional.
2-26	One should not walk between two or more people who are conversing because it is considered rude to do so.
2-27	One should not walk far ahead of an older person, unless leading the person (in which case, one should walk slightly to the side).

Table 1: Survey questions – Part 2.

3-1	What distance should you keep when passing someone?
3-2	How should you acknowledge someone when passing them?
3-3	How should you pass a group of two or more people?
3-4	When showing someone older than you the way, where should you position yourself?
3-5	When showing someone the same age as you the way, where should you position yourself?
3-6	When showing someone younger than you the way, where should you position yourself?
3-7	How should you address someone who is older than you and who you haven't met before?
3-8	How should you address someone who is the same age as you and who you haven't met before?
3-9	How should you address someone who is younger than you and who you haven't met before?
3-10	Should you pause before responding when someone asks you a question? If yes, for how long?
3-11	In an interaction where you and someone else take turns to speak, would you signal that you want to speak? If yes, how do you do that?
3-12	If you are explaining something to someone, what is your primary focus of attention, i.e., where do you direct your gaze?
3-13	If you are explaining something to someone, how often should you make eye contact?
3-14	If you are explaining something to someone, how often would you make eye contact if the person was older than you?
3-15	If you are explaining something to someone, how often would you make eye contact if the person was younger than you?
3-16	If someone is explaining something to you, what is your primary focus of attention, i.e., where do you direct your gaze?
3-17	If someone is explaining something to you, how often should you make eye contact?
3-18	If someone is explaining something to you, how often would you make eye contact if the person was older than you?
3-19	If someone is explaining something to you, how often would you make eye contact if the person was younger than you?
3-20	Would you use a face or head gesture to draw someone's attention to something? If yes, what would that gesture be?
3-21	Would you use a face, head, hand, or body gesture to express gratitude?
3-22	Would you use a face, head, hand, or body gesture to express agreement?
3-23	Would you use a face, head, hand, or body gesture to express respect?
3-24	Would you use a face, head, hand, or body gesture to express friendliness?
3-25	Would you use a face, head, hand, or body gesture to express confusion?
3-26	Would you use a face, head, hand, or body gesture to express comprehension?
3-27	Would you use a face, head, hand, or body gesture to express interest?
3-28	Is there a face head, hand, or body gesture you should not use?
3-29	Would you use a hand or body gesture while speaking to someone?
3-30	Would you use a hand or body gesture while listening to someone?

Table 2: Survey questions – Part 3.

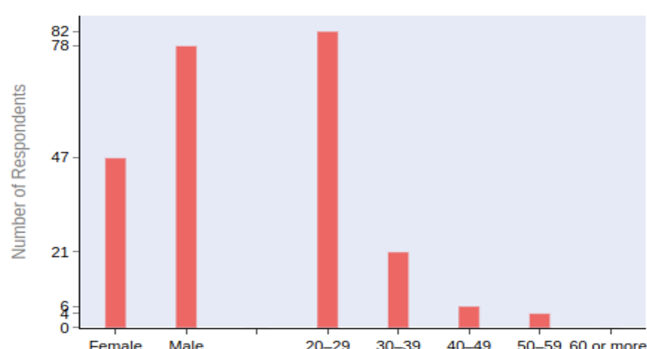


Figure 1: Graphic depiction of the demographics of the 143 respondents who took the pilot survey

2.4 Structure of the Survey

The survey has three parts. Part 1 asks for background demographic information about the respondent. Part 2 asks the respondent to answer twenty-seven questions to determine their view on the correctness of cultural knowledge that was gathered in previous surveys. Part 3 asks the respondent to answer thirty questions formulated to identify different forms of culturally sensitive, respectful behaviours — movements, actions, or activities — and disrespectful behaviours. Concise versions of the questions in Parts 2 and 3 of the survey are shown for convenience in Tables 1 and 2. The full survey is detailed in Appendix I and Appendix II.

2.5 Pilot Survey

Before launching the survey of the general public in Rwanda, it was piloted at Carnegie Mellon University Africa (CMU-Africa) over a two-month period. CMU-Africa was chosen as the pilot site due to the ongoing nature of the project there and the streamlined process for obtaining legal permission to collect data. We collected 108 responses in English and 35 in Kinyarwanda. This sample size provides valuable insights for refining our survey methodology. The pilot helped us improve the questionnaire, particularly in clarifying cultural terminology and adjusting question sequencing. Notably, we received no negative comments about the questionnaire design, indicating that participants found the questions clear and well-constructed. Moving forward, we will use these pilot results to finalize our questionnaire and sampling strategy for the main data collection phase, ensuring a robust and culturally sensitive research instrument.

2.6 Demographics

Of the 143 respondents, 78 were male, and 47 were female. This is a more balanced gender distribution than the population from which the respondents were drawn.

In terms of age, the majority of participants were in the 20–29 age group, followed by a smaller number in the 30–39 range. Very few respondents were aged 40–49, 50–59, or 60 and older. Despite this, the data collected represents a range of demographic groups, as shown in Figure 1.

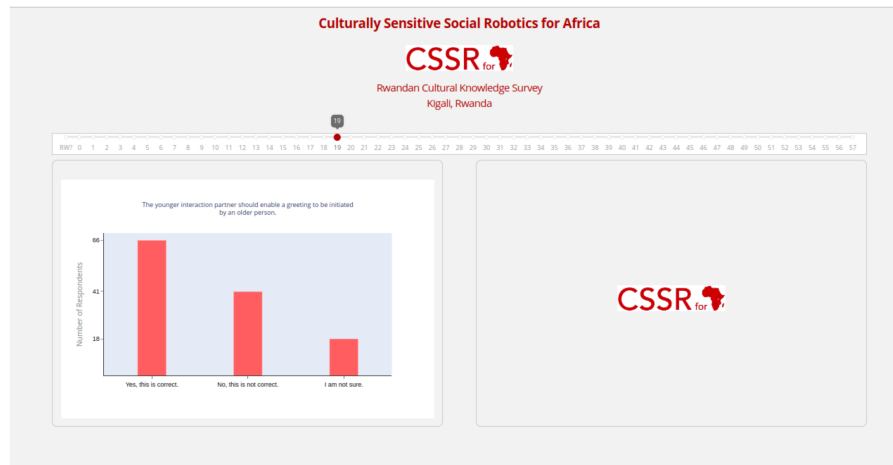


Figure 2: The dashboard used to visualize the responses to each question.

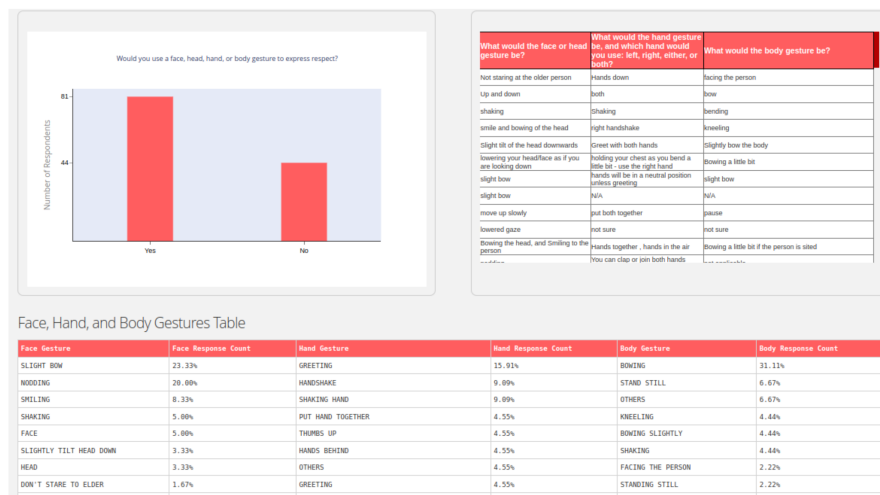


Figure 3: A detailed view of dashboard used to visualize the responses to each question.

2.7 Data Analysis Techniques

Significant effort was expended in performing comprehensive data analysis to build the cultural knowledge base. This involved cleaning and organizing the collected data to ensure accuracy and consistency, and then identifying prevalent consensus answers to each question. Both qualitative and quantitative analysis methods were employed to identify key cultural elements and patterns within the responses.

The data cleaning phase was carried out in two stages, an initial scan by three members of the team to identify questions for the answers were clearly equivocal, and a workshop involving ten members of the team to identify consensus answers. In the first stage, two questions were identified — 3.28 and 3-30 — and they were excluded from further consideration. In the second stage, the answers to each question were displayed and the workshop participants voted to decided on the consensus answer, if one existed. To visualize survey responses, a dashboard was developed using Dash, a Python web framework built on Plotly that specializes in creating interactive data visualization applications. This

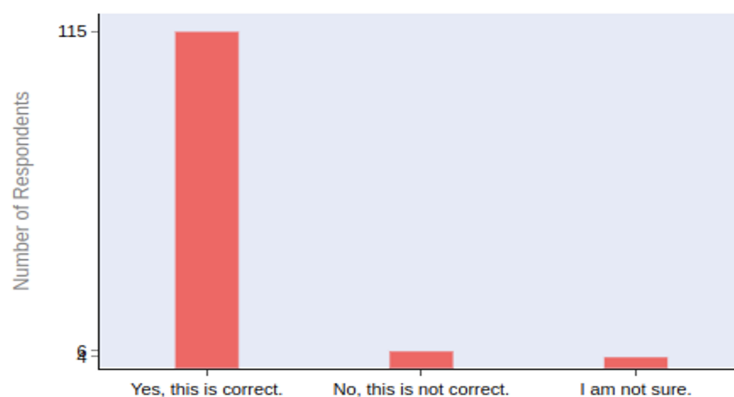


Figure 4: A summary of the responses for Question 2-26 One should not walk between two or more people who are conversing because it is considered rude to do so.



Figure 5: A summary of the responses for Question 3-3 How should you pass a group of two or more people?

dashboard displays all survey questions and allows users to interact with the data using a slider bar to select the question and responses for analysis. The data is presented using bar charts and tables, as illustrated in Figures 2 and 3. This visualization framework improved accessibility and simplified the analysis of survey results. Examples of the histogram of answers to two questions are shown in Figures 4 and 5. No consensus was found for three questions — 2-4, 2-5, and 2-8 — and these were also excluded from further consideration.

The results of this analysis, described in Section 3, forms the foundation for a detailed cultural knowledge base, which will be used to guide the behavior of a Pepper social robot.

3 Survey Results: Rwandan Cultural Knowledge for Respectful Interaction

Tables 3 and 4 presents the consensus answers to the subset of fifty-seven questions in the cultural knowledge survey questionnaire in Appendices I and II, after having removed the questions for which no consensus could be identified. These capture the behaviors, activities, actions, and motions that are considered polite and respectful when interacting with people in Rwanda.

Question	Consensus Cultural Knowledge
2-1	To show respect, one should lower gaze when greeting someone older.
2-2	One should suspend work or movements and pay attention when addressed.
2-3	One should keep intermittent eye contact; lack of eye contact depicts disrespect as it shows divided attention during the interaction
2-6	One should use an open palm of the hand to point to people and objects.
2-7	One should not point an upward facing palm of the hand at someone.
2-9	To show respect, one should bow slightly when greeting someone older.
2-10	To show respect, one should raise both hands when greeting.
2-11	One should not wave at someone from a distance; one should move towards them to greet them
2-12	One should not use the left hand to hand something to someone
2-13	To show respect, one should hand over and accept gifts with two hands and do so from the front, facing the recipient
2-14	To show respect, one should shake hands with the right hand and use the left arm to support the right forearm when doing so.
2-15	An appreciation of rhythmic sound and movement is valued.
2-16	To show respect, one should bow slightly and lower gaze when greeting someone older
2-17	The younger interaction partner should bow when greeting an older person or when rendering a service
2-18	All interactions should begin with a courteous greeting.
2-19	The younger interaction partner should enable a greeting to be initiated by an older person.
2-20	It is respectful to use local languages and they should be used for verbal interaction when possible.
2-21	One should use formal titles when addressing someone.
2-22	One should engage in a preamble before getting to the point, as being too forward may be regarded as disrespectful.
2-23	One should not interrupt or talk over someone when they are speaking.
2-24	One should not talk loudly to an older person
2-25	Behaviours should focus on fostering social connections and relationships; they should not be purely functional.
2-26	One should not walk between two or more people who are conversing because it is considered rude to do so.
2-27	One should not walk far ahead of an older person, unless leading the person (in which case, one should walk slightly to the side).

Table 3: Consensus answers to the subset of the twenty-seven questions in Part 2 of the cultural knowledge survey questionnaire in Appendices I and II. Answers to questions 2-4, 2-5, and 2-8 are not listed as no consensus could be identified.

	Consensus Cultural Knowledge
3-1	One should maintain a distance of one meter or less when passing someone.
3-2	One should say 'Hello' or 'Muraho' when acknowledging someone while passing them.
3-3	One should pass behind a group of two or more people.
3-4	One should position themselves beside someone older when showing them the way.
3-5	One should position themselves beside someone of the same age when showing them the way.
3-6	One should position themselves beside someone younger when showing them the way.
3-7–3-9	The preferred way to address someone, whether they are older, younger, or the same age, and whom you haven't met before, is by saying 'Muraho' or 'Hello'.
3-10	When asked a question, respondents should pause for a few seconds before answering.
3-11	In turn-based conversations, participants can raise their right hand to signal their desire to speak.
3-12	When explaining something to someone, you should direct your gaze equally between the person and the object.
3-13	When explaining something to someone, you should make eye contact often.
3-14	You should make eye contact more often when explaining something to someone older than you.
3-15	You should make eye contact more often when explaining something to someone younger than you.
3-16	When someone is explaining something to you, you should direct your gaze equally between the person and the object.
3-17	When someone is explaining something to you, you should make eye contact often.
3-18	If someone is explaining something to you and they are older than you, you should make eye contact more often.
3-19	If someone is explaining something to you and they are younger than you, you should make eye contact more often.
3-20	To draw someone's attention to something, use a head-nodding gesture while looking at the object.
3-21	To express gratitude, common gestures include nodding, smiling, and bowing the head, using hand gestures like a thumbs up or clasped hands, and slight bowing of the body.
3-22	To express agreement, common gestures include nodding the head and giving a thumbs up with the right hand.
3-23	To show respect, common gestures include a slight bow of the head, a greeting or handshake using the right hand supported by the left, and bowing, which is the most frequent body gesture.
3-24	To express friendliness, people commonly use facial gestures like smiling, hand gestures such as a handshake using both hands or the right hand, and body gestures like hugging.
3-25	When expressing confusion, individuals typically use facial gestures like wrinkling or frowning the brow or tilting the head, hand gestures such as raising both hands or the right hand, and body movements that vary according to the situation.
3-26	When expressing comprehension, individuals typically use head gestures, such as nodding, hand gestures like a right-hand thumbs-up, and body gestures that vary by situation.
3-27	When expressing interest, nodding and smiling are the most common gestures, while hand gestures such as giving a thumbs up with the right hand and body gestures like facing someone are used less frequently.
3-29	One should use body and hand gestures while speaking to someone, which depends on the situation. The most recommended gestures are slight body movement and slightly moving both hands.

Table 4: Consensus answers to the subset of the thirty questions in Part 3 of the cultural knowledge survey questionnaire in Appendices I and II. Answers to questions 3-28 and 3-30 are not listed as no consensus could be identified.

4 Conclusion

This study represents an essential step in developing culturally sensitive social robotics for Rwanda and South Africa. The CSSR4Africa project has successfully piloted a survey at Carnegie Mellon University Africa, gathering 143 responses that provide valuable insights into Rwandan cultural norms. The next phase involves expanding data collection in Rwanda and initiating similar studies in South Africa. Detailed analysis of the results will lead to the development of a comprehensive cultural knowledge database, which will inform the creation of a detailed cultural knowledge ontology. This ontology will ensure that social robots align with local norms. By incorporating these cultural insights, the CSSR4Africa project aims to enhance the acceptance and effectiveness of social robots in Rwanda and South Africa, promoting their successful integration in diverse African settings.

Appendix I: Cultural Knowledge Survey Questionnaire (English)

Respectful Interaction

In daily life, people interact with one another in several ways. They interact verbally using speech and they interact non-verbally using body language, e.g. by gesturing with their hands, arms, shoulders, faces, lips, eyes, and eyebrows. During such social interaction, they often position their bodies in certain ways. It is highly desirable that all interaction between people be conducted in a respectful manner by being aware of social and cultural norms and expectations.

Goal of the Survey

This survey aims to answer the following two questions: “How do you behave respectfully when interacting with people in Rwanda and how should you not behave?”

Purpose of the Survey

The knowledge that is gathered in this survey will be used to equip social robots with cultural knowledge that will allow them to interact respectfully and politely with people using non-verbal, verbal, and spatial modes of behaviour.

Structure of the Questionnaire

The questionnaire has three parts.

In Part 1, we ask you to provide some information about yourself. This information will be kept in strict confidence and it is only used to check that the survey is balanced in terms of age, gender, cultural heritage, and nationality.

In Part 2, we will ask you whether you consider cultural knowledge we have gathered in previous surveys² to be correct or not. The focus of these surveys was on human-robot interaction, derived from human-human interaction, and so the social settings reflects situations where one might encounter a social robot, e.g., hospitals, airports, exhibitions, shopping malls, and offices.

In Part 3, we ask you to answer several questions to help us identify different forms of culturally sensitive, respectful behaviours — movements, actions, or activities — and disrespectful behaviours.

²We canvassed the views of twenty-three people from eight countries in Africa to collect this cultural knowledge.

Part 1: Demographic Information

1. What age are you? ☐ 20–29 ☐ 30–39 ☐ 40–49 ☐ 50–59 ☐ 60 or more.
2. Which are you? ☐ Female ☐ Male

Part 2: Existing Cultural Knowledge

Consider the following statements and select the option to indicate whether or agree with it or not.

1. To show respect, one should lower gaze when greeting someone older.
 - ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
2. One should suspend work or movements and pay attention when addressed.
 - ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
3. One should keep intermittent eye contact; lack of eye contact depicts disrespect as it shows divided attention during the interaction.
 - ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
4. One should not make persistent eye contact with an older person.
 - ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
5. One should not make eye contact when being corrected by someone.
 - ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
6. One should use an open palm of the hand to point to people and objects.
 - ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
7. One should not point an upward facing palm of the hand at someone.
 - ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
8. One should not use the left hand to point to anything.
 - ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.

9. To show respect, one should bow slightly when greeting someone older.
- ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
10. To show respect, one should raise both hands when greeting.
- ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
11. One should not wave at someone from a distance; one should move towards them to greet them.
- ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
12. One should not use the left hand to hand something to someone.
- ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
13. To show respect, one should hand over and accept gifts with two hands and do so from the front, facing the recipient.
- ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
14. To show respect, one should shake hands with the right hand and use the left arm to support the right forearm when doing so.
- ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
15. An appreciation of rhythmic sound and movement is valued.
- ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
16. To show respect, one should bow slightly and lower gaze when greeting someone older.
- ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.

17. The younger interaction partner should bow when greeting an older person or when rendering a service.
 - ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
18. All interactions should begin with a courteous greeting.
 - ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
19. The younger interaction partner should enable a greeting to be initiated by an older person.
 - ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
20. It is respectful to use local languages and they should be used for verbal interaction when possible.
 - ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
21. One should use formal titles when addressing someone.
 - ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
22. One should engage in a preamble before getting to the point, as being too forward may be regarded as disrespectful.
 - ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
23. One should not interrupt or talk over someone when they are speaking.
 - ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
24. One should not talk loudly to an older person.
 - ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.

25. Behaviours should focus on fostering social connections and relationships; they should not be purely functional.
- ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
26. One should not walk between two or more people who are conversing because it is considered rude to do so.
- ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.
27. One should not walk far ahead of an older person, unless leading the person (in which case, one should walk slightly to the side).
- ☐ Yes, this is correct.
 - ☐ No, this is not correct.
 - ☐ I am not sure.

Part 3: New Cultural Knowledge

1. What distance should you keep when passing someone?
 - ☐ Less than 1 m.
 - ☐ 1 – 2 m.
 - ☐ More than 2 m.
2. How should you acknowledge someone when passing them?
 - ☐ No acknowledgement.
 - ☐ Raise eyebrows slightly.
 - ☐ Nod head.
 - ☐ Say hello.
 - ☐ Other. Please specify: _____
3. How should you pass a group of two or more people?
 - ☐ Pass behind them.
 - ☐ Pass between them.
 - ☐ Pass in front of them.
 - ☐ Pass beside them.
4. When showing someone *older* than you the way, where should you position yourself?
 - ☐ Far in front of them.
 - ☐ A little in front of them.
 - ☐ Beside them.
 - ☐ A little behind them.
5. When showing someone *the same age* as you the way, where should you position yourself?
 - ☐ Far in front of them.
 - ☐ A little in front of them.
 - ☐ Beside them.
 - ☐ A little behind them.
6. When showing someone *younger* than you the way, where should you position yourself?
 - ☐ Far in front of them.
 - ☐ A little in front of them.
 - ☐ Beside them.
 - ☐ A little behind them.

7. How should you address someone who is *older* than you and who you haven't met before?
 - ☐ First name.
 - ☐ Last name.
 - ☐ Title first name.
 - ☐ Title last name.
 - ☐ Muraho.
 - ☐ Mwaramutse or Mwiriwe
 - ☐ Other. Please specify: _____
8. How should you address someone who is *the same age* as you and who you haven't met before?
 - ☐ First name.
 - ☐ Last name.
 - ☐ Title first name.
 - ☐ Title last name.
 - ☐ Muraho.
 - ☐ Mwaramutse or Mwiriwe
 - ☐ Other. Please specify: _____
9. How should you address someone who is *younger* than you and who you haven't met before?
 - ☐ First name.
 - ☐ Last name.
 - ☐ Title first name.
 - ☐ Title last name.
 - ☐ Muraho.
 - ☐ Mwaramutse or Mwiriwe
 - ☐ Other. Please specify: _____
10. Should you pause before responding when someone asks you a question? If yes, for how long?
 - ☐ Yes: _____
 - ☐ No.
11. In an interaction where you and someone else take turns to speak, would you signal that you want to speak? If yes, how do you do that?
 - ☐ Yes: _____
 - ☐ No.

12. If *you* are explaining something to someone, what is your primary focus of attention, i.e., where do you direct your gaze?
- ☐ The object being explained.
 - ☐ The face, eyes, or mouth of the person to whom you are explaining.
 - ☐ Mostly the object and sometimes the person.
 - ☐ Mostly the person and sometimes the object.
 - ☐ Equally the person and the object.
13. If *you* are explaining something to someone, how often should you make eye contact?
- ☐ Never.
 - ☐ Occasionally.
 - ☐ Often.
 - ☐ Constantly.
14. If *you* are explaining something to someone, how often would you make eye contact if the person was older than you?
- ☐ Less often.
 - ☐ More often.
 - ☐ No difference.
15. If *you* are explaining something to someone, how often would you make eye contact if the person was younger than you?
- ☐ Less often.
 - ☐ More often.
 - ☐ No difference.
16. If someone is explaining something to *you*, what is your primary focus of attention, i.e., where do you direct your gaze?
- ☐ The object being explained.
 - ☐ The face, eyes, or mouth of the person to whom you are explaining.
 - ☐ Mostly the object and sometimes the person.
 - ☐ Mostly the person and sometimes the object.
 - ☐ Equally the person and the object.
17. If someone is explaining something to *you*, how often should you make eye contact?
- ☐ Never.
 - ☐ Occasionally.
 - ☐ Often.
 - ☐ Constantly.

18. If someone is explaining something to *you*, how often would you make eye contact if the person was older than you?
- ☐ Less often.
 - ☐ More often.
 - ☐ No difference.
19. If someone is explaining something to *you*, how often would you make eye contact if the person was younger than you?
- ☐ Less often.
 - ☐ More often.
 - ☐ No difference.
20. Would you use a face or head gesture to draw someone's attention to something?
If yes, what would that gesture be?
- ☐ Yes: _____
 - ☐ No.
21. Would you use a face, head, hand, or body gesture to express *gratitude*?
- ☐ Yes:
 - What would the face or head gesture be? _____
 - What would the hand gesture be, and which hand would you use: left, right, either, or both? _____ , _____
 - What would the body gesture be? _____
 - ☐ No.
22. Would you use a face, head, hand, or body gesture to express *agreement*?
- ☐ Yes:
 - What would the face or head gesture be? _____
 - What would the hand gesture be, and which hand would you use: left, right, either, or both? _____ , _____
 - What would the body gesture be? _____
 - ☐ No.
23. Would you use a face, head, hand, or body gesture to express *respect*?
- ☐ Yes:
 - What would the face or head gesture be? _____
 - What would the hand gesture be, and which hand would you use: left, right, either, or both? _____ , _____
 - What would the body gesture be? _____
 - ☐ No.

24. Would you use a face, head, hand, or body gesture to express *friendliness*?

☐ Yes:

- What would the face or head gesture be? _____
- What would the hand gesture be, and which hand would you use: left, right, either, or both? _____ , _____
- What would the body gesture be? _____

☐ No.

25. Would you use a face, head, hand, or body gesture to express *confusion*?

☐ Yes:

- What would the face or head gesture be? _____
- What would the hand gesture be, and which hand would you use: left, right, either, or both? _____ , _____
- What would the body gesture be? _____

☐ No.

26. Would you use a face, head, hand, or body gesture to express *comprehension*?

☐ Yes:

- What would the face or head gesture be? _____
- What would the hand gesture be, and which hand would you use: left, right, either, or both? _____ , _____
- What would the body gesture be? _____

☐ No.

27. Would you use a face, head, hand, or body gesture to express *interest*?

☐ Yes:

- What would the face or head gesture be? _____
- What would the hand gesture be, and which hand would you use: left, right, either, or both? _____ , _____
- What would the body gesture be? _____

☐ No.

28. Is there a face head, hand, or body gesture you should *not* use?

☐ Yes:

- What would the face or head gesture be? _____
- What would the hand gesture be, and which hand would you use: left, right, either, or both? _____ , _____
- What would the body gesture be? _____

☐ No.

29. Would you use a hand or body gesture while speaking to someone?

☐ Yes:

- What would the hand gesture be, and which hand would you use: left, right, either, or both? _____ , _____
- What would the body gesture be? _____

☐ No.

30. Would you use a hand or body gesture while listening to someone?

☐ Yes:

– What would the hand gesture be, and which hand would you use: left, right, either, or both? _____ , _____

– What would the body gesture be? _____

☐ No.

Appendix II: Cultural Knowledge Survey Questionnaire (Kinyarwanda)**Igice 1: Umwirondoro**

1. Imyaka ingahe? ☐ 20–29 ☐ 30–39 ☐ 40–49 ☐ 50–59 ☐ 60 cyangwa hejuru yayo.
2. Uri nde? ☐ Gore ☐ Gabo

Igice 2: Ubumenyi bw’umuco buriho

Soma neza interuro zikurikira, uhitemo YEGO cyangwa OYA mu gihe wemeranya niyo nteruro.

1. Mu buryo bwo kwerekana icyubahiro, umuntu agomba guca bugufi mu gihe asuhuza umuntu mukuru.
 - ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
2. Umuntu agomba guhagarika akazi yararimo nibyo yakoraga akumva umuntu umushaka icyo amushakira.
 - ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
3. Umuntu agomba guhuza amaso n’umuntu mu gihe bavugana; kudahuza amaso n’umuntu mu gihe muvugana byerekana ko wamusuzuguye kandi utamwitwayeho.
 - ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
4. Umuntu ntagomba guhuza amaso n’umuntu mukuru.
 - ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
5. Umuntu ntago agomba guhuza amaso n’umuntu Uri Kumukosora.
 - ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
6. Umuntu agomba gukoresha ikiganza gifunguye kugirango yerekane abantu nibintu.
 - ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
7. Umuntu ntagomba gutunga urutoki umuntu arwerekaza hejuru.
 - ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.

8. Umuntu ntagomba gukoresha ikiganza cy'ibumoso yerekana ikintu.
- ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
9. Umuntu agomba guca bugufi mu gihe asuhuza umuntu mukuru.
- ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
10. Muburyo bwo kwerekana icyubahiro, umuntu agomba gukoresha ibiganza byombi asuhuza umuntu.
- ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
11. Umuntu ntagomba gupepera umuntu uri kure; agomba kumwegera akamusuhuza.
- ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
12. Umuntu ntagomba guhereza ikintu umuntu akoresheje ikiganza cy'ibumoso.
- ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
13. Mubyo bwo kwerekana icyubahiro, umuntu agomba kwakira impano akoresheje amaboko abiri kandi akanayakira ari imbere y'umuntu uyimuhaye.
- ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
14. Mubyo bwo kwerekana icyubahiro, Umuntu agomba gusuhuzanya akoresheje ikiganza cy'iburyo akanakoresha ikiganza cy'ibumoso akagishyira ku cy'iburo mugihe asuhuzanya.
- ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
15. Igihe umuntu yishimiye amajwi afite injyana no kuba habaho kugenda, bihabwa agaciro.
- ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.

16. Mubyo bwo kwerekana icyubahiro, umuntu agomba guca bugufi mugihe asuhuza umuntu mukuru cyangwa ukuze.
 - ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
17. Umuntu muto agomba guca bufi mugihe asuhuza umuntu mukuru cyangwa amwaka ubufasha.
 - ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
18. Imikoranire yose igomba gutangirana indamutso.
 - ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
19. Umuntu muto agomba gutegereza umuntu mukuru akamurumutsa.
 - ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
20. Nibyiza gukoresha ururimi mwese muhuriyeho. Kandi rukanakoreshwa mu mikoranire mu magambo.
 - ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
21. Umuntu agomba gukoresha amazina y'icyubahiro mu gihe abwira umuntu.
 - ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
22. Umuntu agomba kubanza agasuhuza ndetse akanibwira abantu ashaka kubwira ikintu, kuko kuvuga uhita urasa ku ntego bigaragara nko kutubaha.
 - ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
23. Umuntu ntagomba kuvugira mu muntu uri kuvuga.
 - ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.

24. Umuntu ntagomba kuvugira hejuru mu gihe ambwira umuntu mukuru.
- ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
25. Imyitwarire igomba kwibanda ku kunoza imibanire n'ubusabane; ntigomba kuba ijyanye n'akazi cg inshingano gusa.
- ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
26. Umuntu ntagomba kunyura hagati y'abantu babiri bari kuganira kuko bigaraga nko kutubaha.
- ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.
27. Umuntu ntagomba kugendera kure y'umuntu mukuru, ahubwo muricyo gihe umuntu agomba kugendera gacye kugirango abe kuruhande.
- ☐ Yego, nibyo.
 - ☐ Oya, ntago aribyo.
 - ☐ Ntago mbizi neza.

Igice 3: Ubumenyi bushya bwumuco

1. Ni iyihe ntera ugomba gushyiramo mu gihe uri kunyura ku muntu?
 - ☐ Minsi ya 1m
 - ☐ 1 – 2 m.
 - ☐ Hejuru 2 m.
2. Ni gute ugomba kwitwara mu gihe unyuze k'umuntu?
 - ☐ Nta kuntu ugomba kwitara.
 - ☐ Kubura amaso gato.
 - ☐ kumusuhuza.
 - ☐ Kuzunguza Umutwe.
 - ☐ Ibindi. Sobanura:_____
3. Ni gute ugomba kunyura ku bantu babiri cyangwa benshi?
 - ☐ Kubanyura inyuma.
 - ☐ Kubanyura hagati.
 - ☐ Kubanyura imbere.
 - ☐ Kubanyura Kumhande.
4. Mu gihe uri kwereka inzira umuntu ukuruta,ni hehe ugomba kuba uri hehe cyangwa uhagaze hehe?
 - ☐ kure ho imbere yabo.
 - ☐ Imbere yabo gato.
 - ☐ Iruhande rwabo.
 - ☐ Inyuma yabo gato.
5. Mu gihe uri kwereka inzira umuntu mungana,ugomba kuba uri hehe cyangwa uhagaze hehe?
 - ☐ kure ho imbere yabo.
 - ☐ Imbere yabo gato.
 - ☐ Iruhande rwabo.
 - ☐ Inyuma yabo gato.
6. Mu gihe uri kwereka inzira umuntu muto kuri wowe,ugomba kuba uri hehe cyangwa uhagaze hehe?
 - ☐ kure ho imbere yabo.
 - ☐ Imbere yabo gato.
 - ☐ Iruhande rwabo.
 - ☐ Inyuma yabo gato.

7. Ni gute ushobora kwita umuntu ukuruta kandi mutanahuye na mbere?
- ☐ Izina rya mbere.
 - ☐ Izina rya kabiri.
 - ☐ (Bwana, Madamu...) Izina rya mbere.
 - ☐ (Bwana, Madamu...) Izina rya kabiri.
 - ☐ Muraho.
 - ☐ Mwaramutse or Mwiriwe
 - ☐ Ibindi. sobanura: _____
8. Ni gute ushobora kwita umuntu muri mu kigero kimwe kandi mutanahuye na mbere?
- ☐ Izina rya mbere.
 - ☐ Izina rya kabiri.
 - ☐ (Bwana, Madamu, Dr, Prof,...) Izina rya mbere.
 - ☐ (Bwana, Madamu, Dr, Prof,...) Izina rya kabiri.
 - ☐ Muraho.
 - ☐ Mwaramutse or Mwiriwe
 - ☐ Ibindi. sobanura: _____
9. Ni gute ushobora kwita umuntu muto kuri wowe kandi mutanahuye na mbere?
- ☐ Izina rya mbere.
 - ☐ Izina rya kabiri.
 - ☐ (Bwana, Madamu...) Izina rya mbere.
 - ☐ (Bwana, Madamu...) Izina rya kabiri.
 - ☐ Muraho.
 - ☐ Mwaramutse or Mwiriwe
 - ☐ Ibindi. sobanura: _____
10. Ugomba kwitonda ho gato, mbere yo gusubiza ikibazo umuntu akubajije? Niba ari yego, bigomba kumpara igihe kingana gute?
- ☐ Yego: _____
 - ☐ Oya.
11. Mu biganiriro aho wowe nundi muntu bisaba ko mwaka ijamba kugirango muvuge, ni ngombwa ko werekane ko ushaka kuvuga? Niba ari yego, wabikora ute?
- ☐ Yego: _____
 - ☐ Oya.
12. Mu gihe uri gusobanurira umuntu ikintu, ni kihe kintu ugomba kubanza kwitaha, urugero, ni hehe ugomba kwibanda ?
- ☐ Ku kintu urigusobanura.
 - ☐ Mwisura, mu maso cyangwa ku munwa w'umuntu uri gusobanurira..
 - ☐ Cyane cyane umuntu, rimwe na rimwe nikintu.

- ☐ Byose icyarimwe umuntu nikintu.
13. Niba uri gusobanurira umuntikintu, Ni ryari mugomba guhuza amaso?
- ☐ Nta na rimwe.
- ☐ Rimwe na rimwe.
- ☐ Akenshi.
- ☐ Bihoraho.
14. Mu gihe uri gusobanurira ikintu umuntu, ni ryari mugomba guhuza amaso niba uwo muntu akuruta?
- ☐ Bitari kenshi.
- ☐ kenshi Cyane.
- ☐ Nta tandukaniro.
15. Mu gihe uri gusobanurira ikintu umuntu, ni ryari mugomba guhuza amaso niba uwo muntu ari muto kuri wowe?
- ☐ Bitari kenshi.
- ☐ kenshi Cyane.
- ☐ Nta tandukaniro.
16. Mu gihe uri gusobanurira umuntu ikintu, ni kihe kintu ugomba kubanza kwitaha, urugero, ni hehe ugomba kwibanda?
- ☐ Ku kintu urigusobanura.
- ☐ Mwisura, mu maso cyangwa ku munwa w'umuntu uri gusobanurira.
- ☐ Cyane cyane umuntu, rimwe na rimwe nikintu
- ☐ Byose icyarimwe umuntu nikintu.
17. Mu gihe umuntu ari ku gusobanurira ikintu , ni ryari ugomba guhuza amaso nawe?
- ☐ Nta na rimwe.
- ☐ Rimwe na rimwe.
- ☐ Kenshi.
- ☐ Bihoraho.
18. Mu gihe umuntu ari ku gusobanurira ikintu , ni ryari ugomba guhuza amaso nawe mu gihe uwo muntu akuruta?
- ☐ Bitari kenshi.
- ☐ kenshi Cyane.
- ☐ Nta tandukaniro.
19. Mu gihe umuntu ari ku gusobanurira ikintu , ni ryari ugomba guhuza amaso nawe mu gihe uwo muntu ari muto kuri wowe?
- ☐ Bitari kenshi.
- ☐ kenshi Cyane.
- ☐ Nta tandukaniro.

20. Ushobora gukoresha amarenga mu maso werekana ko witondeye ikintu?
Niba ari yego, ayo marenga yaba ari ayahe?
- ☐ Yego: _____
- ☐ Oya.
21. Ushobora gukoresha amarenga yo mu maso, umutwe, y'ikiganza cyangwa umubiri ugaragaza *gushimira*?
- ☐ Yego:
- Ni ibihe bimenyetso byo mu maso cyangwa umutwe? _____
 - Ni ikihe bimenyetso by' ikiganza, ni ikihe kiganza ushobora gukoresha :ubumoso, uburyo, kimwe muri byo cyangwa byose? _____ , _____
 - Ni ibihe bimenyetso by'umubiri wakoresha? _____
- ☐ Oya.
22. Ushobora gukoresha amarenga yo mu maso, umutwe, y'ikiganza cyangwa umubiri ugaragaza *kwemeranya*?
- ☐ Yego:
- Ni ibihe bimenyetso byo mu maso cyangwa umutwe? _____
 - Ni ikihe bimenyetso by' ikiganza, ni ikihe kiganza ushobora gukoresha :ubumoso, uburyo, kimwe muri byo cyangwa byose? _____ , _____
 - Ni ibihe bimenyetso by'umubiri wakoresha? _____
- ☐ Oya.
23. Ushobora gukoresha amarenga yo mu maso, umutwe, y'ikiganza cyangwa umubiri ugaragaza ko utanze *icyubahiro*?
- ☐ Yego:
- Ni ibihe bimenyetso byo mu maso cyangwa umutwe? _____
 - Ni ikihe bimenyetso by' ikiganza, ni ikihe kiganza ushobora gukoresha :ubumoso, uburyo, kimwe muri byo cyangwa byose? _____ , _____
 - Ni ibihe bimenyetso by'umubiri wakoresha? _____
- ☐ Oya.
24. Ushobora gukoresha amarenga yo mu maso, umutwe, y'ikiganza cyangwa umubiri ugaragaza *ubushuti*?
- ☐ Yego:
- Ni ibihe bimenyetso byo mu maso cyangwa umutwe? _____
 - Ni ikihe bimenyetso by' ikiganza, ni ikihe kiganza ushobora gukoresha :ubumoso, uburyo, kimwe muri byo cyangwa byose? _____ , _____
 - Ni ibihe bimenyetso by'umubiri wakoresha? _____
- ☐ Oya.

25. Ushobora gukoresha amarenga yo mu maso, umutwe, y'ikiganza cyangwa umubiri ugaragaza *urujijo*?

☐ Yego:

- Ni ibihe bimenyetso byo mu maso cyangwa umutwe? _____
- Ni ikihe bimenyetso by' ikiganza, ni ikihe kiganza ushobora gukoresha :ubumoso, uburyo, kimwe muri byo cyangwa byose? _____ , _____
- Ni ibihe bimenyetso by'umubiri wakoresha? _____

☐ Oya.

26. Ushobora gukoresha amarenga yo mu maso, umutwe, y'ikiganza cyangwa umubiri ugaragaza ko wumvise cyangwa *wasobanukiwe*?

☐ Yego:

- Ni ibihe bimenyetso byo mu maso cyangwa umutwe? _____
- Ni ikihe bimenyetso by' ikiganza, ni ikihe kiganza ushobora gukoresha :ubumoso, uburyo, kimwe muri byo cyangwa byose? _____ , _____
- Ni ibihe bimenyetso by'umubiri wakoresha? _____

☐ Oya.

27. Ushobora gukoresha amarenga yo mu maso, umutwe, y'ikiganza cyangwa umubiri ugaragaza *ushishikajwe*?

☐ Yego:

- Ni ibihe bimenyetso byo mu maso cyangwa umutwe? _____
- Ni ikihe bimenyetso by' ikiganza, ni ikihe kiganza ushobora gukoresha :ubumoso, uburyo, kimwe muri byo cyangwa byose? _____ , _____
- Ni ibihe bimenyetso by'umubiri wakoresha? _____

☐ Oya.

28. Hari amarenga ya maso, y'ikiganza cyangwa y' umubiri udashobora *gukoresha*?

☐ Yego:

- Ni ibihe bimenyetso byo mu maso cyangwa umutwe? _____
- Ni ikihe bimenyetso by' ikiganza, ni ikihe kiganza ushobora gukoresha :ubumoso, uburyo, kimwe muri byo cyangwa byose? _____ , _____
- Ni ibihe bimenyetso by'umubiri wakoresha? _____

☐ Oya.

29. Ushobora gukoresha amarenga y'ikiganza cyangwa ayandi y'umubiri mu gihe uri *kuvugana numuntu*?

☐ Yego:

- Ni ikihe bimenyetso by' ikiganza, ni ikihe kiganza ushobora gukoresha :ubumoso, uburyo, kimwe muri byo cyangwa byose? _____ , _____
- Ni ibihe bimenyetso by'umubiri wakoresha? _____

☐ Oya.

30. Ushobora gukoresha amarenga y'ikiganza cyangwa y'umubiri mu gihe urikumva *umuntu*?

☐ Yego:

- Ni ikihe bimenyetso by' ikiganza, ni ikihe kiganza ushobora gukoresha :ubumoso, uburyo, kimwe muri byo cyangwa byose? _____ , _____
- Ni ibihe bimenyetso by'umubiri wakoresha? _____

☐ Oya.

Appendix III: Dashboard for Cultural Knowledge Survey Questionnaire Responses

The CSSR4Africa Questionnaire Dashboard is an interactive tool designed to visualize qualitative survey responses collected as part of the Rwandan Cultural Knowledge Survey. Developed using Plotly Dash in Python, the dashboard enables users to dynamically explore survey results through interactive visualizations. This section provides an overview of the dashboard's structure, functionality, and implementation details.

The Figure 6 provides a visual representation of the multiple-choice question type in the dashboard layout.

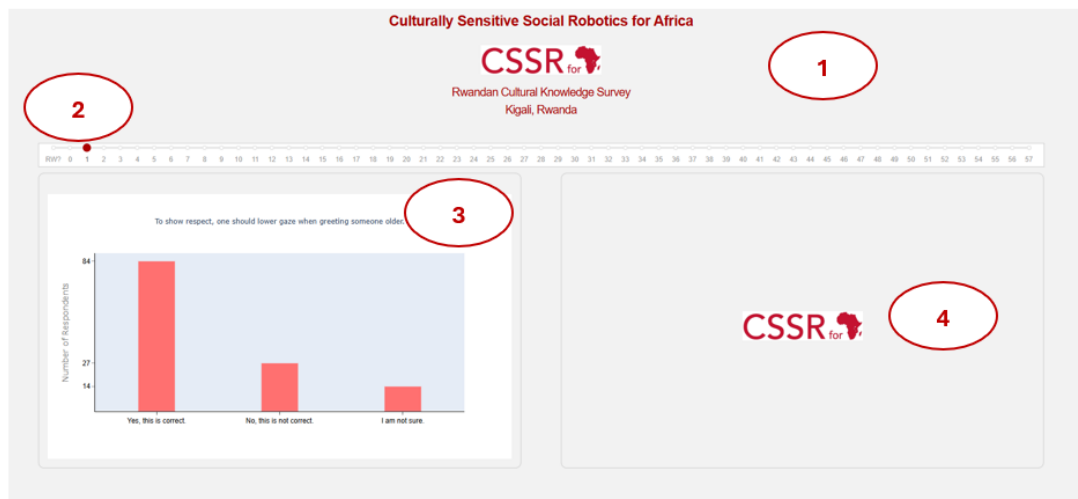


Figure 6: CSSR4Africa Cultural Knowledge Survey Dashboard. The image illustrates the main sections: (1) Header Section, (2) Slider Section, (3) Bar Chart, and (4) Logo.

- **(1) Header Section:** This section includes the title *Culturally Sensitive Social Robotics for Africa*, the CSSR4Africa logo, and the location *Kigali, Rwanda*. It serves as an introduction to the survey and its objectives.
- **(2) Slider Section:** Positioned below the header, the slider allows users to navigate through different survey questions, numbered from 0 to 57. Users can select a question, and the results update dynamically based on their selection. To move through all the questions, users can click on a specific question number on the slider or, after selecting the first question, use the keyboard arrow keys, a mouse, or a slide remote.
- **(3) Bar Chart:** This section presents the data visualization corresponding to the selected multiple-choice questions. The results are displayed using a bar graph, where the x-axis represents the different multiple-choice options available for the selected question, and the y-axis shows the count of responses for each choice. Based on these results, the option with the highest number of responses is chosen as the final conclusion for the survey question.
- **(4) Logo:** This section remains inactive since only multiple-choice questions without text have short answers.

The Figure 7 provides a visual representation of a multiple-choice question type that includes an "Other" option, allowing respondents to specify their own answers in the dashboard layout.

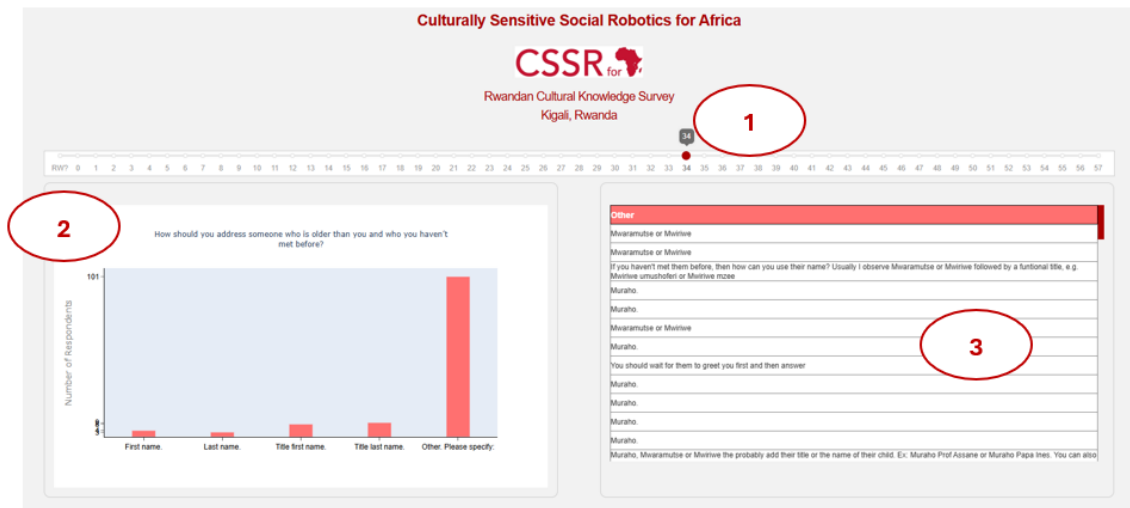


Figure 7: CSSR4Africa Cultural Knowledge Survey Dashboard. The image illustrates the main sections: (1) Sample selected question using the slider, (2) Bar chart, and (3) Table displaying responses for the "Other" option.

- **(1) Sample Selected Question:** This section represents a sample selected question that includes "Other" as a multiple-choice answer option.
- **(2) Bar Chart Visualization:** The bar chart visualization is similar to the one explained previously in Figure 6.
- **(3) Table Display for "Other" Responses:** For respondents who select "Other" and provide their own answers, their responses are displayed in a table format, as shown in this section.

The Figure 8 provides a visual representation of a multiple-choice question with a "Yes" or "No" option. If "Yes" is selected, respondents are allowed to specify their own answers, which are then displayed as tables in the dashboard layout.

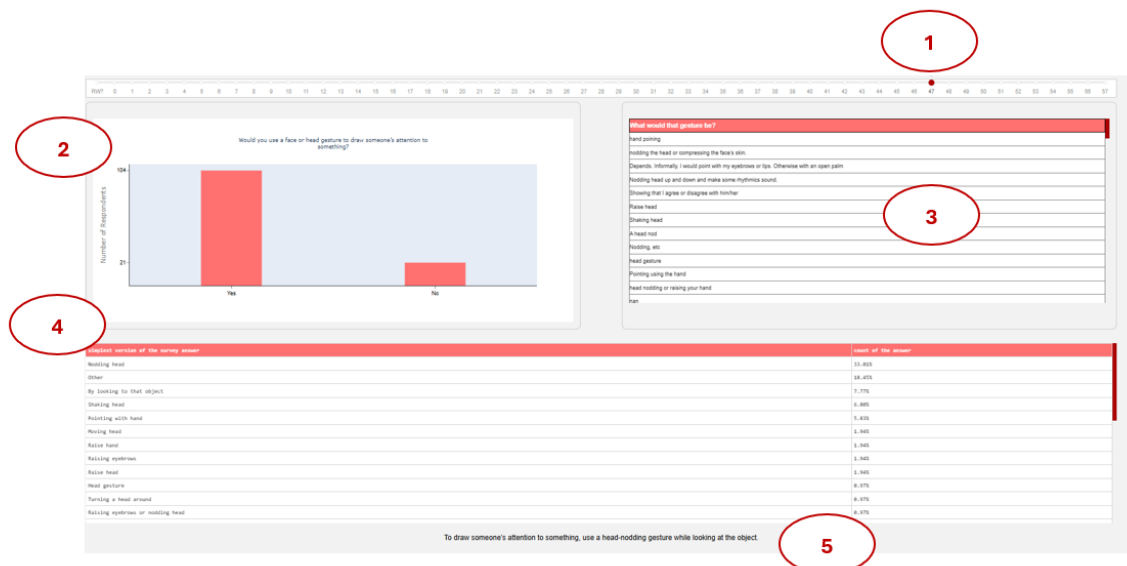


Figure 8: CSSR4Africa Cultural Knowledge Survey Dashboard. The image illustrates the main sections: (1) Selected Question, (2) Multiple-Choice Responses, (3) Gesture Specification Table, (4) Annotated Gesture Table, and (5) Conclusion Answer.

- **(1) Selected Question:** This section represents a randomly selected question that requires short answers, specifically requesting the gesture used for a particular type of behavior.
- **(2) Multiple-Choice Responses:** This section displays the responses for the multiple-choice question, illustrating whether gestures are used or not for the specified behavior.
- **(3) Gesture Specification Table:** If "Yes" is selected, respondents specify the gesture used, which is then displayed in the dashboard as a table.
- **(4) Annotated Gesture Table:** Before this table is generated, the table in section (3) is annotated to group similar gestures that were responded to using different phrases or expressions but belong to the same category. This section then organizes the gestures and displays the gesture names along with their corresponding percentage in the collected data.
- **(5) Conclusion Answer:** Based on the percentage shown in table (4), the final conclusion for the selected question is determined.

File Structure

The dashboard directory is organized to include data files, asset files, source code, a `README.md` file, requirements, and configuration files. The `config` folder contains essential configuration files, including `dashboard_configuration.ini`, which uses key-value pairs to specify the data source—either an Excel file or a Google Spreadsheet. The data directory contains all survey-related datasets, such as `cssr-406009-380cb664c48a.json`, which serves as Google Sheets credentials for accessing survey data, and `Cultural Knowledge Survey.xlsx`, the primary Excel file containing survey responses. Additionally, the folder includes multiple CSV files categorized into hand, face, and body movement data.

These files follow the naming format `<name>_sdf_<body|hand|face>_<question number>` and represent the annotated versions of responses. These annotations help draw conclusions from short-answer questions, specifically from Questions 47 to 57, on the dashboard.

The `src` folder contains the `assets` folder, which includes `dashboard_style.css`, a stylesheet that defines the visual appearance of the dashboard, including layout, typography, tables, buttons, and interactive elements. Additionally, the folder includes `dashboard_application.py`, which implements the Dash web application for visualizing survey responses with interactive features such as a question selection slider, bar chart visualizations, a dynamic data table, and an extra section that appears based on specific questions. The `dashboard_implementation.py` script processes survey responses and updates visualizations dynamically. The `dashboard_data_processing.py` script loads and processes survey data from Google Sheets or an Excel file, filters Rwandan participants, categorizes survey questions, and prepares data for visualization.

Lastly, `dashboard_questions_data.py` stores multiple-choice survey questions in a structured dictionary format, where each question is a key and answer choices are stored under "options", allowing for efficient bar graph generation and response categorization. Additionally, the `dashboard_requirements.txt` file lists the dependencies required for running the application, and the `README.md` provides documentation on how to install, configure, and execute the dashboard. A detailed representation of the directory structure is shown in Figure 9.


```
dashboard
├── config
│   └── dashboard_configuration.ini
├── data
├── cssr-406009-380cb664c48a.json
├── Cultural Knowledge Survey.xlsx
├── .
├── .
├── .
├── src
│   ├── __pycache__
│   ├── assets
│   │   └── dashboard_style.css
│   ├── dashboard_application.py
│   ├── dashboard_data_processing.py
│   ├── dashboard_implementation.py
│   └── dashboard_questions_data.py
├── CSSR4AfricaLogo.svg
├── dashboard_requirements.txt
└── README.md
```

Figure 9: Directory structure for the CSSR4Africa Cultural Knowledge Survey Dashboard

Executing the Dashboard

To run the dashboard, first determine the data source: Google Sheets or an Excel file. During the active survey phase, Google Sheets was used to monitor real-time responses, as it dynamically updates when new data is received from the linked Google Form. Once survey collection is complete, the Google Sheet can be downloaded as an Excel file for further analysis in the dashboard. The dashboard supports both versions, and we can use the one that best suits the condition.

Getting Google Credentials (JSON File)

Go to [Google Cloud Console](#) and sign in with your Google account. Create or select a project by clicking [Select a Project](#), then enable the Google Sheets API via **APIs & Services > Library**, search for Google Sheets API, and click **Enable**; create credentials under **APIs & Services > Credentials**, select Service Account, fill in details, assign at least Editor or Owner role, and click **Done**; generate and download the JSON key by navigating to the Keys tab, clicking **Add Key > Create New Key**, **choosing JSON**, and storing the file securely as `credentials.json`.

Clone the Repository

```
git clone https://github.com/cssr4africa/cssr4africa.git
```

```
cd dashboard
```

Install Dependencies

```
pip install -r dashboard_requirements.txt
```

Configure Data Source

Modify the *config/dashboard_configuration.ini* file to specify the data source:

Option 1: Use Google Sheets: Set `use_spreadsheet` to `true` and provide the `spreadsheet_id` by adding the spreadsheet ID.

```
use_spreadsheet true
use_excel false
spreadsheet_id 1nWPZX65-UQ-4nUGiKPIyPFY5AmtvW8ZdeyXEP-K5Vv
excel_file Cultural Knowledge Survey.xlsx
excel_sheet Sheet1_English_Version
```

Option 2: Use Excel File: Set `use_excel` to `True` and `use_spreadsheet` to `False`. Then, specify the file name in `excel_file` and provide the sheet name. For example, if the first sheet of the Excel file is named "English," use that.

```
use_spreadsheet false
use_excel true
spreadsheet_id 1nWPZX65-UQ-4nUGiKPIyPFY5AmtvW8ZdeyXEP-K5Vv
excel_file Cultural Knowledge Survey.xlsx
excel_sheet Sheet1_English_Version
```

Running the Dashboard

```
python .\src\dashboard_application.py
```

Click [here](#) to open the dashboard.

References

- [1] N. M. Bradburn, S. Sudman, and B. Wansink. *The art of asking questions: Improving the quality of questionnaire data*. Jossey-Bass, 2004.
- [2] P. Zantou and D. Vernon. Culturally-sensitive human-robot interaction: A case study with the pepper humanoid robot. In *Proc. IEEE Africon*, Nairobi, Kenya, 2023.
- [3] B. Bruno, C. T. Recchiuto, I. Papadopoulos, A. Saffiotti, C. Koulouglioti, R. Menicatti, F. Mastrogiovanni, R. Zaccaria, and A. Sgorbissa. Knowledge representation for culturally competent personal robots: requirements, design principles, implementation, and assessment. *International Journal of Social Robotics*, 11(3):515–538, 2019.

Principal Contributors

The main authors of this deliverable are as follows (in alphabetical order).

Eyerusalem Birhan, Carnegie Mellon University Africa.

Muhirwa Richard, Carnegie Mellon University Africa.

David Vernon, Carnegie Mellon University Africa.

Document History

Version 1.0

First draft with survey questionnaire, for validation before conducting the survey.
David Vernon.
25 October 2023.

Version 1.1

Fixed minor typos.
David Vernon.
2 November 2023.

Version 1.2

Changed male/female to man/woman to determine the gender of the respondent.
Explained the context of the existing cultural knowledge.
Removed the question about name, to keep the survey anonymous.
Replaced question about being Rwandan by two questions on cultural heritage and nationality.
Removed the < 20 age group.
David Vernon.
20 November 2023.

Version 1.3

Changed the answers in Part 2 from I agree / do not agree to this is / is not correct.
David Vernon.
20 November 2023.

Version 1.4

Removed several questions from Part 3 to align them with the CSSR4All questionnaire.
David Vernon.
1 December 2023.

Version 1.5

Remove two questions from Part One. Group face, hand, and body gesture-related behaviors and minimize the number of questions from 48 to 30 for Part Three.
Eyerusalem Birhan.
19 January 2024.

Version 1.6

Added revision date to cover page.
Part 1, Q2: changed "Woman" and "Man" to "Female" and "Male".
Part 3, Q2: added "Nod head" option.
Part 3, Q3: added "Pass beside" option.
Part 3, Q7 - Q9: added "Muraho" and "Mwaramutse or Mwiriwe" options.
Part 3, Q21 - Q27: added "head" to question.
Part 3, Q28: added "hand" and "body" to question.
Part 3, Q29 & Q30: changed "would you not use" to "would you use" (to be consistent with other questions).
Removed References.
Added an appendix for a Kinyarwanda version of the questionnaire.
David Vernon.
2 February 2024.

Version 1.7 Added content to appendix for the Kinyarwanda version of the questionnaire.

Eyerusalem Birhan.

23 February 2024.

Version 1.8 Added links to the online questionnaire in Kinyarwanda and English.

David Vernon.

31 July 2024.

Version 2.0 Added a section on the knowledge representation architecture suggested by Barbara Bruno et al. [3]. Revised the Cultural knowledge ontology in Appendix III to align it more closely with the parameters of the robot actions, as suggested in [3]. Added a section on mapping the questions in the survey to the ontology. Added a section on representing the knowledge derived from the questions in the survey using key-value pairs, with keys derived from the ontology. Added a provisional set of values for each key-value pair. Revised the abstract to reflect these changes.

David Vernon.

19 August 2024.

Version 2.1 Added material on knowledge categories and knowledge representation. Removed lip and eyebrow gestures from the ontology. Moved the ontology from Appendix III to Fig. ??.

David Vernon.

22 August 2024.

Version 2.2

Added Tables 3 and 4, which contains the consensus answers to the fifty-seven questions in the survey. It includes the complete survey responses, except for questions 2-4, 2-5, and 2-8, which were rejected during the workshop, and question 3-28, which was excluded after observing the survey results.

Added Table 2, which contains the subset of the consensus answers to the 39 questions. These 39 questions were chosen based on Tables 3 and 4 by excluding questions marked with an asterisk that do not map to any of the ontology keys.

Updated Table 5. Added values under the Values column which were previously empty and updated the key values as follows:

- Replaced PassingPosition with two new key values: PassingPositionAvoid and PassingPositionPreferred.
- Replaced AccompanyingDistance with two new key values: AccompanyingDistanceAvoid and AccompanyingDistancePreferred.
- Added a new key: WordAddressMethod.
- Replaced TurnTakingUtterance with three new key values: TurnTakingUtteranceSignal, TurnTakingUtteranceAvoid, and TurnTakingUtteranceInitiates.
- Replaced FocusofAttentionTarget with three new key values: FocusofAttentionTargetGreetingOlder, FocusofAttentionTargetAddressed, and FocusofAttentionTargetExplanation.
- Replaced EyeContactDuration with EyeContactDurationInteraction.

- Replaced EyeContactFrequency with six new key EyeContactFrequencyExplainOlder, EyeContactFrequencyExplainYounger, EyeContactFrequencyListen, EyeContactFrequencyListenOlder, and EyeContactFrequencyListenYounger.
- Replaced NodExtent with eight new key values: NodExtentAttention, BowExtentGratitude, NodExtentAgreement, BowExtentRespect, FacialGestureFriendliness, FacialGestureConfusion, NodExtentComprehension and NodExtentListening.
- Replaced DeicticShape with two new key values: DeicticShapePoint and DeicticShapePointAvoid.
- Replaced IconicShape with IconicShapeSpeaking.
- Replaced SymbolicShape with nine new key values: SymbolicShapeRespect, SymbolicShapeRespectHandShake, SymbolicShapeGratitude, SymbolicShapeAgreement, SymbolicShapeFriendliness, SymbolicShapeConfusion, SymbolicShapeComprehension, SymbolicShapeAvoid and SymbolicShapeAvoidGreeting.
- Replaced BowExtent with three new key values: BowExtentGreeting, BowExtentGratitude and BowExtentRespect.
- Added a new key: IconicShapeSpeaking.

Eyerusalem Birhan.
28 November 2024.

Version 2.3

Moved Section 2 Representation of Cultural Knowledge, and Section 3.2 Action and Cultural Parameter Values to Deliverable D5.4.1.

David Vernon.
21 December 2024.

Version 2.4

Added the summary of the survey questions in Tables 1 and 2.
Added Section 2 Survey Methodology.

David Vernon.
29 December 2024.

Version 2.5

Added Appendix III: Dashboard for Cultural Knowledge Survey Questionnaire Responses (4), which explains the dashboard in detail and how to execute it.

Eyerusalem Birhan.
21 February 2025.

Version 2.6

Update the slider explanation, the file structure, and the executing the dashboard sections.

Eyerusalem Birhan.
16 March 2025.

Version 3.0

Fixed formatting problems caused by using geometry and lmodern packages: incorrect margins and incorrect fonts on cover page, respectively.

Responsible person changed to Eyerusalem Birhan to better reflect the time and effort spent on the deliverable.

David Vernon.

29 April 2025.

Version 3.1

Resolved references

David Vernon.

16 June 2025.