

A Lightweight Web-based Survey Tool to Study the Social Acceptability of Expressive Gestures

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Online-based survey tools are becoming more powerful And gaining more potential for data gathered in the field of research on several sectors. There are many tools to conduct and develop surveys and questionnaires. However, plenty of them is for commercial uses, overloaded, less accessible in the admin panel and sometimes challenging to embed in the website what is needed. Sometimes participants get bored because of the lengthy survey with basic designs. That is why a lightweight survey tool is highly needed for easy access to data, a better admin panel, and a customized user interface. In this study, we develop an open-source web-based survey tool and design a randomized questionnaire to integrate them into a better-looking user interface with a better questionnaire format to explore the social acceptance of expressive behaviour. Also, this study shows the completion rate of the survey with a graph that can be accessed by the admin easily.

CCS Concepts: • **Human-centered computing** → *Web-based interaction; Graphical user interfaces.*

Additional Key Words and Phrases: survey tool, question Design, modern interface, gestures

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1 INTRODUCTION

The rise of data technology changes the data drives in today's world. Previously, there were various types of data collecting methods like paper-based surveys. However, the vast amount of data became untabulated and unmanageable. That is why the digital survey is much more flexible and easier to handle the sheer amount of data. In this project, we consist of four fundamental issues, which are 1—Generating the survey, 2. User Interface of the survey 3. Storage of the data, and 4. Analysis of the Data.

First, we will see the existing software, which is also the solution to the survey problem—for example, LimeSurvey and Survey Monkey. LimeSurvey is a very versatile, cross-platform survey software that allows users to create

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questionnaires for their own needs. Nevertheless, to create survey questions, the user requires some knowledge. Also, the free version has limited storage though there was no feature restriction in the pro version [24]. The SurveyMonkey website has some benefits too. It gives the user to create a survey anonymously. However, in the free version survey creator can add only ten questions with 100 answers. Furthermore, in survey customization with Survey-Monkey, there are only 12 themes available to choose from that users can select.[23] So, depending on what is needed, it could be tricky to find good software. So, to control data, a specific user interface and time-consuming lightweight web survey tool could achieve those objectives by capturing the data and representing it with a dynamic graphical user interface.

In this paper, this web-based survey tool and the ideas are applied to a study about Social Acceptability in the context of expressive gestures in various areas using a questionnaire to data gather, store the data and conveniently show the data also; this tool shows a graphical interface that how many student or people complete the survey in time. So that any researcher can add a questionnaire, gather the data, and quickly see the results without prior programming knowledge For example, a person in a cafe who wears a headset while communicating with others looks odd regarding social acceptability [20]. Also, Schwind et al. showed that the social acceptability of technologies is needed to validate the questionnaire to evaluate stimuli where he found some lacking in generalizing the models [19]. In the former studies, Schwind et al. investigated that if a group of users accepts mobile devices as social objects, using the Stereotype Content Model (SCM) can predict and explore the social acceptability when using mobile devices. [18]

This report will also review the other literature based on web application tool and different types of questionnaire methods. Also, give an overview of the tool that has been built and discuss some key features in Section 2. Then in the following, Section 3 will discuss the result and highlight the advantages over the traditional method. Furthermore, Section 4 shows the conclusion of this report showing how an excellent graphical user interface and better admin panel help to complete a lengthy survey and make the application more useful.

2 MATERIALS AND METHODS

2.1 Related Work

Several research publications have been reported about conducting surveys using the internet. There are several numbers of standardised tools that can conduct and validate socioeconomic measures. Ryan et al. developed a new package of software called SF-36, which measure the administration of electronic mode questionnaire properties. 79 healthy and 36 chronic patients completed an electronic survey and a paper-based also. And showed that 79% were more partial to electronic SF-36, whereas 22 percent chose paper-based questionnaires [13]. Staggers et al. generate a bar chart through SM software that shows a panel that is distributed in each round of responses which developed as a different survey. In this project, the author showed that for data analysis, the data has to forward to another software (SPSS version) [22]. Schleyer et al. demonstrated a web-based survey controlled through an email that has basic HTML pages and also conducted on different operating systems. This research showed that 84% of participants finished their survey online while 16% used mail because of the programming error [17]. Klieve et al. conducted a survey through LimeSurvey showing the benefit and challenges for researchers. Also provided a response rate from the participants and showed them an external SPSS file for data analysis. In this literature, a 74% response rate has been shown among 91 potential participants [8]. Jones et al. implemented an open-source, visual interface data viewers to explore survey data with the Django framework and to visualise the survey data D3.js has been used. This survey questionnaire answer is based on demographic data on a standard template. Also, this tool can visualise the survey data quantitatively along with the mean response rate for each equation.[6]. Sekulla et al. generated a more secure, lightweight, self-hosted feedback tool that can integrate within companies' servers and networks. Companies administrators can access the secured data with a CSV export function and later discuss it with other security companies and their administrators for better

Table 1. Some Traditional Online survey tool And their Pros & Cons

Name of the survey	Advantages	Disadvantages
LimeSurvey [24]	Versatile, Cross-Platform software, Well designed	Difficult to integrate, Free version has limited storage
SurveyMonkey [23]	Create Questionnaire anonymously, Various Themes	Only ten questions with hundred participants in the free version
Google Forms [5]	Various theme option, unlimited questions and participants	Low accessibility in admin's side, privacy of the data
TypeForm [11]	Basic Visual Report ,Unlimited Questions , Smooth Data integration , Custom Theme Option	Limit participator in Free version, Poor flexibility for designing
Zoho Survey [14]	15 questions with 150 participants , Customize questionnaire	Complicated to extract users responses.

improvements[21]. Schippers et al. developed a custom web-based tool called Tyche. Using this tool, questions can be displayed with each photo in a random order reducing the subjectivity. Also, in this survey, the result is shown by real-time data and visualised to the administrator instantly [16] Fiske et al. argued with the two types of subjects called Warmth and competence and put them into two dimensions. One dimension has positive data and does not dispute with others, and another has unfavourable stereotypes [4]. Kummerfeld et al. presented an annotation tool called SLATE that supported various scales like characters, documents, Etc., which is easily changeable and easy to install and process [9].

2.2 Aims & Motivation

Several industries and researchers are surveying for various purposes. Moreover, developers and researchers must consider the design and methods to conduct a better survey. Also, the following has been taken care of to develop the project:

- UI should be interactive and User friendly
- Better Questionnaire method and display them with appropriate scale in the user interface.
- Question should have multiple choices
- Must not have Unnecessary and irrelevant questions
- Should be Short and Fast survey
- Minimize data processing and collection
- Numeric and Drop down list

2.3 System Description

2.3.1 Introduction of the system. In this proposed system, an admin dashboard has been developed. Where admin can log in with a security key, create or add unlimited questions for research needed. A modern front end has been developed for this application. Html5, CSS3, Bootstrap, and JQuery are used to develop the standard user interface. On the backend PHP and for the database, MySql has been used to store the data. Also, with the help of Application programming interface (API) and some libraries, we developed a better user interface and displayed

the analysis data in the graph. Also, the admin can instantly show the user's list data in a pdf file. Admin and participant's roles can be distinguished in the following:

- Admin can manage, Create or add unlimited questions, and has full access to the data.
- Can customise the user interface.
- Visualise the participant's submitted data through graphs by analysing them.
- Can set group questionnaires
- After completing, a token number will generate for each participant using the device's mac address, which will be needed to get one credit point in the course lecture.

2.3.2 Social Acceptance. Brewster et al. described social acceptability, investigating the perceiving feelings of both users and spectators while interacting or performing some action. In the paper, the author also described the user's and spectator's social acceptance when the user does a task and how others feel comfortable or embarrassed, natural or awkward, which leads to an impression of the user's task. On the other hand, for spectators, social acceptance is the viewpoint or understanding of the user's actions, which create an impression of the task users. The combination of the user's and the spectator's viewpoints is a form of Social Acceptance [3].

2.3.3 Creating questionnaire. The first concern creating this project is how to create the survey questionnaire from the information which will be asked to the participants. While in this survey, social acceptability of Expressive Gestures will be measured in different settings. However, we are using body expressions and different gestures [18]. Montero et al. differentiate between the user's and observer's acceptance of socially during the interaction. [10]. In the report, the author described the influences of social acceptance in different cultures, times, interaction types, and users' positions. And showed that ability to understand the user's manipulation of a device showed visible results in social acceptance of spectators. Rico et al. described social acceptability with the gestures in location and a set of an audience like partners, friends, etc., which impact the willingness of users to make the gestures and also increases the acceptance in the audience of familiarity [12]. Gilbert et al. designed and developed a new scale range names WEAR Scale, which can predict the specific wearable acceptance. The author showed that likeableness and acceptability are maintained positive relationships [7]. Bangor et al. presented 2300 survey data from 200 studies about SUS (System Usability Scale) and showed its robustness and technology-friendly scoring method [1]. In this project, we will use different types of questionnaire methods:

2.3.4 System Usability Scale. System Usability Scale (SUS) is a quick and robust measurement method of people's perception with 50 potential questions that the creator assembled, which strongly correlates with the questions and the items selected. [18]. Here in this project, we will use ten traditional items from the original SUS questionnaire pool and assemble them with values mentioned (1-5) from left to right. The left side value is Strongly Disagree, and the right side value is Strongly Agree. [15].

2.3.5 Stereotype Content Model. SCM is called When people set an assumption on their behaviours or intentions, whether positive or negative, and their ability to carry out that viewpoint. Those groups premise other people's intent which is called warm, and the ability to pursue it, which is called competence.

2.3.6 WEearable Acceptability Range. WEearable Acceptability Range (WEAR) scale is specially designed to predict the acceptability of specific wearable devices. In Wear v.1, there are 73 items kept for expert review. Those 73 items reviewed and consisted of 50 items in version 2.1 led to piloting and evaluation that led the number of items to 14 in version 3.1 [1].

2.4 Creating a User Interface for the users' side

After creating the questionnaire format, we have to display it digitally on a laptop, Pc, or mobile screen. There are various methods we can use to display it. But in this project, we have applied two methods. One is we create

a hard-coded HTML file with some specific questions. But the survey generation needs to be dynamic because it could change when the survey program changes. That's why we used API to add unlimited questions. In the interface for the user's side, we keep five main pages. Also, to design the web page, CSS3 and bootstrap are also used for their consistency and interaction capability between web pages.

2.4.1 Start page: When users enter the survey with <https://survey.xenosbd.com/> A starting page will be shown describing the survey program, how much time will it take and a short description of the organising institution. . Also on this page, a full consent paper will be shown if someone wants to look. Also, two logos of the institution and a button is created with Bootstrap along with CSS3.

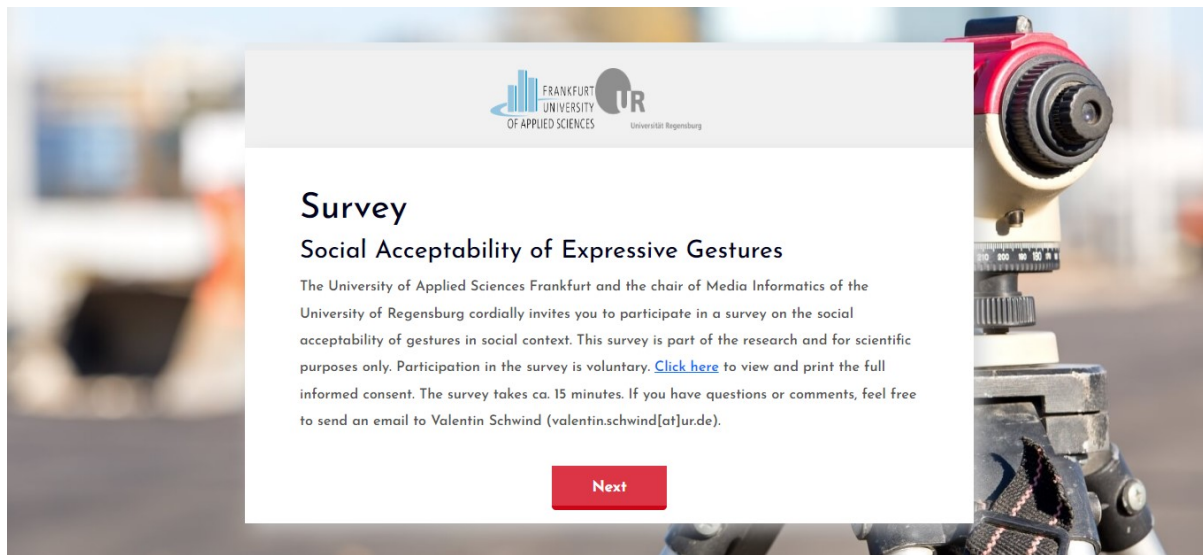
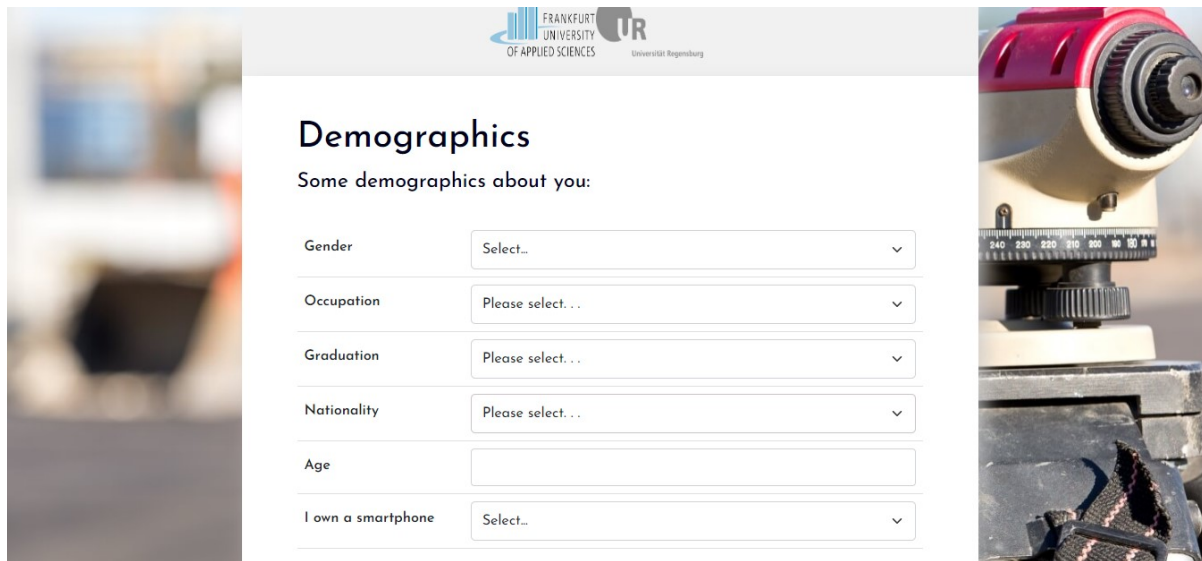


Fig. 1. Starting Page of the Survey

2.4.2 Demographics: On the Demographics page, participants ask about their Gender, Occupation, Graduation, Nationality, Age and a question about owning a smartphone or not. The demographic data of participants will be taken anonymously.

2.4.3 Instruction: Then the next page is about the instruction on how to complete the survey. At the bottom of each page, a back and next buttons are also added if participants want to go back and can see the input value.

2.4.4 Questionnaires: After giving instructions, a questionnaire page will appear on the next page. Stimuli and a question will appear together. First, a scene description will be placed about the stimuli. After that, the questions will be asked. On each page, two types of scale will be used, 1. Wear Scale t and SCM scale. The wear scale questionnaire type is divided into three different custom contexts .5 points from Not at all(1) to Extremely(5) is for SCM scale and wear scale for Gender context from left to right (rather by a male 1), to rather by a female (5) is given. Own the custom context questionnaire, five questions are given, and in Gender, the context has two questionnaires, and in SCM based questionnaire nine comprehended items are used (1. Confident 2. good-natured3. Intelligent, 4. competent, 5. warm 6. Sincere 7. competitive 8. tolerant 9. independent.) These SCM and WEAR scale questionnaires will appear randomised to keep away from series effects. On the last question page, Some

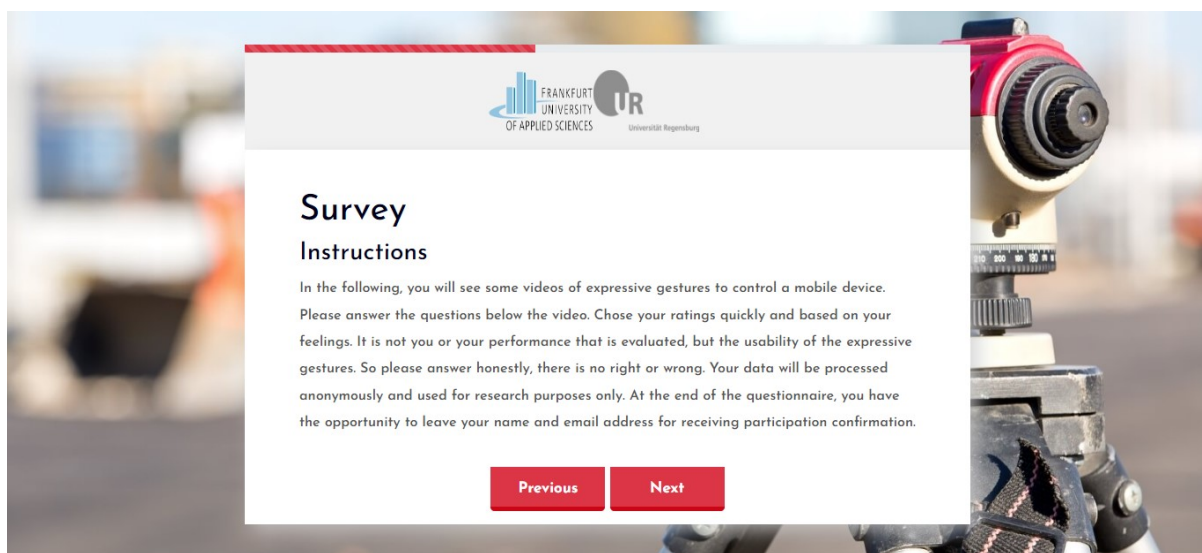


The image shows a survey form titled "Demographics" with the subtitle "Some demographics about you:". The form is set against a background of a blurred industrial scene on the left and a close-up of a red and yellow surveying instrument on the right. The form includes the following fields:

- Gender: Select...
- Occupation: Please select...
- Graduation: Please select...
- Nationality: Please select...
- Age: (text input field)
- I own a smartphone: Select...

Logos for Frankfurt University of Applied Sciences and Universität Regensburg are visible at the top of the form.

Fig. 2. Demographic Page of the Survey



The image shows a survey instruction page. It features a white central box with text and two red buttons at the bottom. The background is the same as Figure 2. The text in the box reads:

Survey Instructions

In the following, you will see some videos of expressive gestures to control a mobile device. Please answer the questions below the video. Chose your ratings quickly and based on your feelings. It is not you or your performance that is evaluated, but the usability of the expressive gestures. So please answer honestly, there is no right or wrong. Your data will be processed anonymously and used for research purposes only. At the end of the questionnaire, you have the opportunity to leave your name and email address for receiving participation confirmation.

At the bottom of the box are two red buttons: "Previous" and "Next". Logos for Frankfurt University of Applied Sciences and Universität Regensburg are visible at the top of the box.

Fig. 3. Instruction Page of the Survey

additional custom questionnaires will be asked in wear scale (Strongly Disagree) to (Strongly Agree) and two feedback text questions.

2.4.5 End survey: After successfully completing the survey, a unique code will be generated. And participants email address will be added to the database.

Admin Login

Email

Password

Login

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Fig. 6. Starting Page of the Survey

2.5.2 Database Management System : Mysql and PHP servers create a database and store the user’s given data. Three tables are made to store the data 1. Emails, 2. trials, and 3. users. All the questionnaire answers and participants’ demographic data will store in the trial tables system in the user’s table. Users’ email addresses with their IDs will be stored in the emails table after completing the survey in the localhost. But dynamically we store the feedback of a participant and their email address in admin’s dashboard.

SurveyDash

MAIN

Dashboard

SURVEYS

All Surveys


Add New

OTHER

Logout

Welcome Md Sabbir Ahmed!

ALL SURVEYS

#ID	TITLE	DESCRIPTION	IMAGE	ACTIONS
5	Social Acceptability	A person with a smartphone performs the following gestures:		Delete

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Handcrafted With

Fig. 7. Adding Questionnaire of the Survey

2.5.3 Display Completion rate with chart.js: Because of the lengthy survey, sometimes people or students could not fulfill the survey. They get bored or annoyed in the middle of the survey. That is why an analysis of the survey completion rate is necessary. In this project, the admin can analyze the survey completion rate and visualize the result instantly with a simple click. The chart.js library is used. Chart.js is better to use because of its straightforwardness and simplicity. It took less time to initialize compared with other visualization libraries.[2]

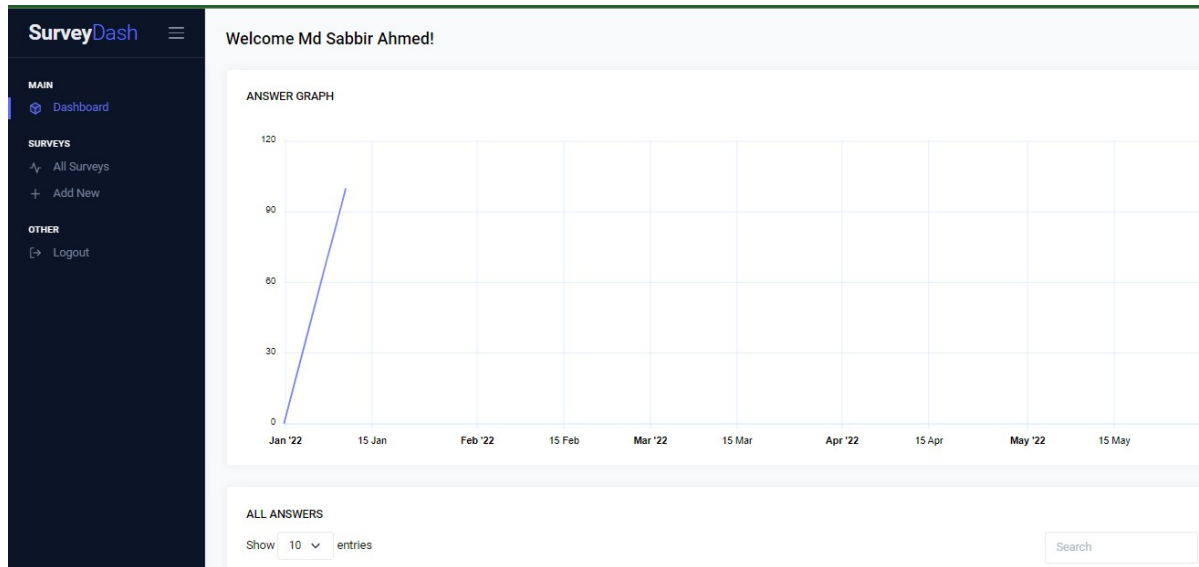


Fig. 8. Completion Rate of the Survey

3 RESULT AND DISCUSSION

The system which is reported in this paper is a bug-free, open-source online web-based survey tool that assists the studies about Social acceptability in Expressive gestures. This project is done in a collaborative effort with the researchers, designers, and participants. The main objective is to make the system lightweight and easy to access, have a modern front end, and have better accessibility on the admin side. The advantage of this system is that it is very concise and clear. This report aimed to go through all the processes from design to development.

- Validated the scale with a more accurate way to obtain the final score. The scoring point is set from 1 to 5 (Strongly disagree to Strongly Agree) in both the wear scale and SCM scale.
- Setting an appropriate questionnaire is more accessible in this system. Admin or researchers can take specific questionnaires for their research, feed them in a custom group and display them randomly.
- The user interface for the user's side is more visually attractive, has a stunning input scale, and tries to keep the survey format in a more academic and standard manner.
- The responsiveness of the device has been solved in this system. Participants can use it through laptop, pc, mobile, or tablet.
- Participants can go back to the previous questions and show the input data. However, can't go to the next page unless all the questionnaires are filled.
- To maintain the system maintained to avoid legal problems and informed consent of participation.

- After completing the survey, the admin can see the results and can analyze them instantly through a graph.
- A unique code will be generated after completing the survey. This code will generate through participating id. That means code will be generated differently for each participants and store the input data in the first completion of the survey.

3.1 Discussions

From the perspective of maintaining and designing, the lightweight web-based tool is convenient to use, user-friendly, and easy to store. Because It is free, the researcher can add or change multiple questionnaires customized with context and store and display the data without inconvenience. This application can be used in many research institutions if they have to fulfill many requirements.

4 CONCLUSION

There are several web-based application tools already available in recent days. However, Most of them have some lacking to fulfill the researcher's needs. Either those are difficult to integrate, or they are expensive to use. For those reasons, a lightweight survey tool could be used to satisfy the requirements. Sometimes lengthy surveys could make participants bored. Many participants could not complete the survey for the extended time it took. That is why it is necessary to create the user interface to be more user-friendly and modern looking, along with better accessibility for the admin or researchers. Moreover, this report also discussed the process of questionnaire creation. Also, storing the user data and analyzing them in a better way could be done with this project by generating a graph report through a user-friendly interface. Though this report is about the social acceptability of expressive behaviors, the functionality could be used in other survey projects.

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