



Article

How Families' Use of Digital Technology Can Be a Tool for Reducing Loneliness and Improving Food Intake among Older Adults

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Abstract: The purpose of this study was to explore how a technical solution implemented among older adults and connected with an app supervised by an app administrator can reduce loneliness, prevent malnutrition, and inspire social eating and networking. In October 2020, a survey was distributed to 3500 administrators of the one-button computer communication tool Komp. Komp consists of a screen placed with older adults and an app used by the administrator of the tool. The survey addresses aspects that can provide new insights into how older adults can use digital solutions as a link to family and external networks. The study results show that due to COVID-19, 65% of respondents said they used Komp more frequently than before, but only 5% of current use was associated with eating meals together. However, 54% of the app administrators indicated that this could be a good future activity. Furthermore, 88% thought Komp could contribute to more socializing through shared meals. This study elicited almost 1650 constructive comments on experience, use, and recommendations. The study results show that digital solutions can be a link between older adults and their families and external network. Such tools can address needs connected to loneliness, social isolation, and food intake.

Keywords: older adults; loneliness; food intake; COVID-19; digital technology



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1. Introduction

The number of older adults is increasing worldwide. In Norway, the population of older adults over the age of 80 years is expected to triple by 2060, and the 90-plus age group is expected to increase five times relative to 2020 [1]. The Norway population census shows that in 2019, 53% of Norwegian older adults lived in a single-person household. Among women aged 80 years or older, two out of three live alone, whereas the same applies to only one in three men. Although there are many older adults who live alone, there are also more than before who live with a partner. One reason for this may be that life expectancy of men is increasing, and as they tend to stay in partnerships, the share of older people living in partnerships has increased [2]. However, as we age, loneliness and poor health occur more frequently, and loneliness, as well as social isolation, are major contributors to malnutrition [3]. Implementation of digital technology in health care has been suggested as one avenue towards healthy ageing for older adults [4]. In this article, we investigate whether a novel digital device can contribute to a reduction in loneliness and social isolation and, consequently, to an improvement in older adults' food intake.

Various health conditions such as living alone, physical inactivity, lack of social network, and frailty are associated with old age [5]. Among these, reduced mobility, both in oneself and one's contemporaries, can lead to less social interaction and networking and more time spent alone [6,7]. Loneliness and social isolation are described as two different conditions, and both represent significant risks in terms of health issues among older adults [8,9]. Loneliness is described as the subjective feeling of being alone in combination with a wish for more social contact than is attainable [10]. Social isolation is described as an objective absence or very limited physical contact with others such as

family and friends [10]. For older adults, the feeling of being alone can be affected by both loneliness and social isolation [11,12]. Loneliness has been measured as stable when it comes to older adults up to 80 years, but it increases rapidly for those over 80. In old age (80 plus), approximately 40–50% self-report that they often feel lonely [13]. For older adults under the age of 80, between 5 and 10% feel lonely [14]. Social isolation is characterized by a lack or inadequacy of social contact with other people, as reflected by a limited size of social network and a lack of meeting places. Older people are more likely to be isolated compared to younger generations. The social networks of older adults are reduced in scope and ultimately consist mainly of family and close friends [15].

The incidence of perceived loneliness and food-related problems increases with age due to factors such as loss of a partner, loss of social networks, and age-related health issues [16]. For example, the SOLINUT study showed that 50% of older adults had a dietary intake that was not sufficient to meet their daily nutritional needs, and approximately 30% never shared a meal with family or friends, revealing their degree of social isolation [17]. Digital technology has been framed as a possible solution to increase interaction among older adults [18]. Digital technology for older adults can be a tool for maintaining a higher degree of functional independence throughout old age. This, in turn, can contribute to a better quality of life and influence healthy ageing [4]. The positive effect of technological solutions acts as a link between older adults with different needs and people in close relationships with the older adults [18]. To reap the benefits of technology for ageing and longevity, technologies that are inclusive and benefit everyone need to be designed [19]. A newly developed digital communication tool, Komp, uses warm technology to reduce loneliness among older adults [20]. Although studies have been carried out with a focus on technology and an aim of reducing social isolation and loneliness [8], there is a lack of studies focusing on food intake and the use of technology.

The recent COVID-19 pandemic is an example of a situation in which increased social isolation was particularly noticeable among older adults. In their article about COVID-19, ref. [21] discussed the consequences of isolating older people and the possible resultant public health challenges. Social isolation in the COVID-19 situation meant that many older adults did not have the same opportunities for a nutritionally complete diet or to be as physically active as they were before the pandemic [21]. Thus, as the COVID-19 pandemic particularly reduced older adults' mobility and social interaction, most older adults became more isolated [22]. The start of the COVID-19 pandemic in 2020 also led to the rapid adoption of the use of new and existing digital technologies in society. Especially for older adults and their families, this became important because of the lack of physical contact [23]. Ref. [21] recommended that digital solutions be highlighted as a relevant future measure for older adults. However, little is known about the needs of older people regarding technology. In our study, we investigated whether a digital communication device recently launched in Norway could be instrumental in improving older adults' quality of life during the pandemic shutdown.

Research has revealed that older adults living at home may be unrecognized and unsupported until they receive home care [17]. Because they are left unattended, it can often be difficult for them to maintain good health, which can, in turn, interfere with maintaining good nutritional status [24]. Ref. [25] found a link between eating alone and malnutrition. The study showed that older adults who ate alone ate fewer meals and fewer fruits and vegetables and had a lower intake of protein in their diet [25]. Food, meals, and the context of the meal are essential for older adult's eating behavior and represent important elements of everyday life [26]. Nutrition is essential for healthy and active ageing [27]. A meal becomes more meaningful when shared, food tastes better, one tends to eat more, and meals also become more regular [16]. As the shutdown and isolation during the pandemic reduced older adults' possibilities for social interactions, more knowledge is needed with respect to whether using a digital communication tool could, to some extent, substitute physical contact and physical contact at meals.

The purpose of this study was to explore how a technical solution implemented among older persons and connected with an app supervised by family/caregivers could inspire networking and social eating via communication technology. We hypothesize that a reduction in loneliness, social isolation, and risk of malnutrition can be achieved.

2. Materials and Methods

In this study, the use of an innovative tool for communication between older adults and family/caregivers was investigated through a survey administered to the administrators of the tool. We first describe the tool, its purpose, and function, followed by descriptions of the research design, participants, and questionnaire.

2.1. The Communication Tool, Komp

The tool is a one-button computer developed for older adults who cannot manage modern technology (Figure 1). Connected to the computer is the Komp app administrated by the family/caregivers, which connects smartphones or tablets to the Komp screen (Figure 2).



Figure 1. The Komp screen (illustration courtesy of No Isolation).

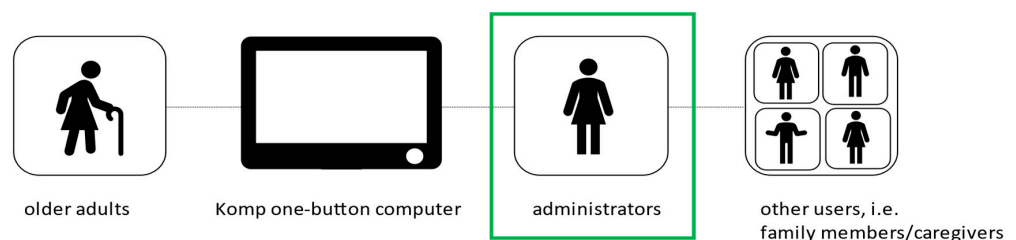


Figure 2. The social network facilitated by Komp. (Ill: Antje Gonera, Nofima).

One person functions as administrator of the app. All app users, such as family members or caregivers, must be invited in order to access the Komp Family app, which functions as a private social network. Through the app, one can send photos and messages and make two-way video calls with Komp. The original intention of Komp was to provide a simple tool for older adults to be in touch with family and/or caregivers.

Komp was developed by No Isolation (www.noisolation.com, accessed on 20 November 2022), a Norwegian company founded in 2015 with a focus on user empathy and the goal of reducing loneliness and social isolation through the use of warm technology [20]. Technology is often devised without full consideration of the target user

group. Warm technology is an approach to technology design from a person-centered perspective [28]. Komp has a built-in 4G subscription and is available in most countries in Europe. During the COVID-19 pandemic, sales of Komp devices in Norway increased from 650 in 2019 to more than 4000 devices by the end of 2020. The number of app users in Norway in November 2019 was 19,000 persons.

2.2. Research Design—Procedure

A survey was developed to collect information from Komp administrators about the possibility of using the tool to participate in activities together. These activities are an extension of Komp’s purpose as only a communication device.

The survey was administered by Nofima, and the web application software EyeQuestion (Logic8, Elst, Gelderland, the Netherlands, version 5) for Sensory and Consumer Research was used to collect responses. A link to the questionnaire was distributed to app administrators via No Isolation’s database. Prior to answering the survey, the respondents had to sign a consent form electronically. The survey was distributed to all Komp administrators (approximately 3500) in November 2020. The response form was sent to Nofima, and only researchers associated with the project had access. No personal data were collected, as IP addresses were not linked to the questionnaire. Respondents had the option use an external link to send their email address and take part in a lottery to win a gift card worth EUR 100. The email addresses collected in this way were deleted immediately after the lottery was finished. Participants could also choose which grocery store they wanted the gift card from. A total of five gift cards were distributed.

2.3. Respondents

A total of 748 app administrators answered the survey. They provided free-text answers connected to the questionnaire, with a total of 1652 free-text answers related to social meals, physical activities, networking, technology, and COVID-19.

2.4. Questionnaire

The measures were developed specifically to achieve the aims of the study. Due to limitations of the data collection method (smartphone), knowledge of the respondents (app administrators), and topics to be investigated, questions were developed in a group process involving researchers, technologists, and No Isolation. The questionnaire consisted of four parts (see Appendix A for the complete questionnaire). Part 1 measured the age of the app administrators and demographic characteristics of the older adult Komp users. In part 2, the Komp users’ social and daily activities were registered. Part 3 registered how COVID-19 influenced Komp usage. Part 4 investigated what the administrators thought about new areas for use of Komp related to food and physical activity (not reported here). Some of the questions were open for free-text answers (see Table 1).

Table 1. Number of free-text responses to questions in the survey.

Question	No. of Quotations
Has the corona situation led to new uses of Komp? (If yes, describe)	259
Would social meals via Komp, where the older adult eats with you or others, be a good idea? (If yes: describe?)	406
Would social meals via Komp, where the older adult eats with you or others, be a good idea? (If no: describe?)	133
Please provide other ideas to how meals and physical activity can provide new uses of Komp.	403
Do you see a potential in the current situation [Authors’ note: COVID-19 lockdown] for using Komp in new ways?	451

2.5. Data Analysis

The survey data were analyzed using SPSS (ver. 27.0.1.0 IBM Corp., Armonk, NY, USA). Descriptive statistics, frequencies, and crosstabs were used to describe the data.

3. Results

In this section, we describe the age distribution of the app administrators who answered the questionnaire, demographic characteristics of Komp users, and how use and possible uses of the Komp communication tool were viewed by app users. A selection of free-text responses to various questions are presented to provide in-depth understanding of the topics. In total, the app users provided more than 1650 lines of free-text responses through the survey indicating current and future uses of Komp (Table 1).

The age distribution of the app administrators (N = 748) was (in descending order of responses): 40–59 years, 46%; 20–39 years, 28%; 60+ years, 23%; and <20 years, 3%.

3.1. Characteristics of Komp Users

More than 60% of the Komp users were 86 years or older, whereas 15% were 80 years or younger. Women constituted a majority (80%) of Komp users. Almost two-thirds (64%) lived in their own homes, whereas 19% lived in institutions and 14% live in senior apartments. Among Komp users, 32% were still married/cohabiting, whereas widow(er)s constituted 58% of users. A proportion of the Komp users 42% lived in cities, whereas 58% lived in less densely populated areas. For details, see Supplementary Materials Table S1.

3.2. Loneliness and Network

More than 80% of app administrators indicated that reducing loneliness by using Komp was important. “Increasing the network with Komp is an excellent way to reduce loneliness. Imagine looking forward to meeting someone every day. It can fill life with great content and increase the quality of life”. Social meeting arenas and networks were identified as important, and 77% of Komp users reported having regular contact with family and friends. However, only 19% reported regularly participating in activities outside the home, 21% had a small or no network, and 41% were mostly alone. “It would have been very nice if more people could connect together, both from organized services and relatives/friends”. See Supplementary Materials Table S2 for details.

3.3. Social Meals and Food Intake

Less than one-third of Komp users did their own food shopping, whereas 23% had their meals delivered, and 46% had others who shopped for them (Table S2). “She has her food bought, and cooks it herself. Sounds like a good idea. We will definitely try this”.

Only 5% of users used Komp for meals, but more than 76% of the app administrators considered using Komp for shared meals a good idea (Table 2). “My seniors and I would have really appreciated it if I could have arranged a dinner and agreed to eat together over Komp :)”. A proportion of 39% of app administrators indicated that social meals through the use of Komp could be important for increasing appetite, and 27% thought it would help Komp users to eat more. “I hadn’t thought of this, but it was a clever idea”.

Table 2. Social meals and food intake through Komp use; N = 748.

Current use of Komp for eating together	n	%
Yes	34	5
No	714	95
Total	748	100
Would shared meals via Komp, where older people eat together with you or others, be a good idea?	n	%

Table 2. *Cont.*

Current use of Komp for eating together	n	%
Yes, a good idea	571	76
No, not a good idea	177	24
Total	748	100
What using Komp for eating together could contribute to *	n	% of N = 748
Increase appetite	296	40
Eat more	204	27
Enjoy oneself	468	63
Reduce loneliness	605	81

* Check-all-that-apply question.

For 24% of app administrators, eating together with the Komp user was not an option. “The elderly must feel comfortable with the technology to enjoy a shared meal. Our user is a bit sceptic”.

3.4. The Impact of COVID-19 on the Use of Komp

The COVID-19 situation, with lockdowns and isolation requirements for older adults, led to increased use of Komp. The study results show that 65% of app administrators reported increased use of Komp. “During a shutdown, this is worth its weight in gold” (Table 3). Of those who reported new uses (n = 261), free-text analysis of the answers showed that 68 app administrators (9% of 748 app administrators) answered that COVID-19 was the direct reason for buying Komp for the older adult. “We bought Komp because our elderly people lost a lot of contact with their families when the corona outbreak occurred. It has helped a lot to bring some joy into their everyday life, both with conversations and pictures :)”.

Table 3. Impact of COVID-19 on the use of Komp; N = 748.

Change in frequency of Komp use because of COVID-19 situation	n	Percent
More often	486	65
No change	254	34
Less often	8	1
Total	748	100
New uses of Komp because of the COVID-19 situation		
New use	261	35
No change	487	65
Total	748	100

3.5. Technology and Communication

In our study, we found that for 67% of older adults, Komp was the only digital tool they used. A proportion of 30% of users were not active Internet users, and only 8% were active Internet users (Table S2). “Grandma has great challenges with using technology. That’s why we chose Komp :)”. “The elderly miss the chat from friends, associations and neighbors etc. The daily chat is so important. And with talk and joy comes the zest for life”. This comment illustrates how important it is to be able to communicate with other people.

4. Discussion

In this paper, we investigated whether a simple digital communication device could be a useful tool for reducing loneliness and, consequently, improving food intake among older adults. The results address different needs connected to loneliness, social isolation, and food intake. Our findings indicate that digital solutions such as Komp can be a link between older adults and their families and external networks.

4.1. Loneliness and Network

Research shows that loneliness and social isolation are described as two different aspects [29]. In our study, these two aspects partly come together in that, for example, older adults in institutions might not be lonely, but they may be isolated from their family networks. Loneliness and social isolation among older adults are acknowledged and can be difficult to cope with in their lives [30]. Our findings show that although most app users said that the older adult had regular contact with family and friends, they thought that the use of Komp increased the opportunities for contact. Administrators suggested many ideas that could help the older adult to both build a network and to feel less alone in their own home. Older adults who are unable to visit each other physically can be together digitally, or they can participate in events via a digital device, such as a screen, in their own homes. Events suggested by app administrators included singing sessions or that the older adult could follow activities organized by, for example, non-governmental organizations. Such activities can also facilitate one-way communication with older adults who just want to listen, or have something social to look at, but who are no longer able to engage themselves.

4.2. Social Meals and Food Intake

In our study, eating together was not something that app users had previously considered. However, based on their positive feedback, they thought that social meals via Komp could be a factor that could reduce loneliness and increase food intake among Komp users. A lack of appetite was pointed out as a problem for many of Komp users. The literature shows that although malnutrition increased with age, it is often a challenge for relatives or friends to recognize the symptoms of malnutrition in older adults [31,32]. Buying food, eating, and preparing food were identified as challenges for many Komp users. One possible solution could be that Komp users and app administrators not only eat together but also prepare food together by communicating through a screen, e.g., Komp. Although the majority of app administrators thought this was a good idea, many app administrators thought it could be challenging for some of older adults. They indicated that it was not suitable for everyone. Some of these insights were connected to where the older adults lived or where they ate their meals. Older adults living together may not have the same need to share meals with other people. Living and eating alone is associated with a risk for malnutrition, as reported in several studies [17,33–35]. However, app users pointed out that some older adults do not like to share meals with others and would rather eat alone because they may have challenges related to eating. With increased age, many older adults experience oral problems such as reduced saliva production, difficulty swallowing, and dental problems [36], which can also affect their social contact with other people and increase their desire to eat alone [37].

4.3. The Impact of COVID-19 on the Use of Komp

During the COVID-19 pandemic, loneliness and social isolation were brought together for many Komp users. As the COVID-19 pandemic particularly reduced older adults' mobility and social interaction, most older adults became more isolated [38]. Quality of life aspects such as being close to older adults were suddenly lost at the beginning of the pandemic for those who were isolated either in their own homes or in care facilities [39]. Not being able to visit their older relatives was decisive for many families when it came to purchasing a technological device. For older adults, access to others through Komp, in many ways, replaced physical contact with family and others in their network, as they were able to send pictures and follow each other's everyday lives.

4.4. Technology and Communication

Challenges related to the use of technology are related to design and usability, as well as how older adults can interact with family and friends [40]. Several studies on older adults show that they are less likely to adopt new technology than younger [41–43] adults. The digital gap will gradually be reduced for those who are older in working life today, as they are

already part of digital everyday life. This will also apply to, for example, gender differences and social conditions [44]. In our study, only one-third of the Komp users had digital devices other than the Komp screen, and only a few of them used the Internet in their everyday life. Although several respondents mentioned the importance of older adults becoming more familiar with digital interaction, most people manage to handle an analogue screen. The responses from app users showed that social contact such as communicating with family was essential for those who did not have relatives nearby.

4.5. Implications for Future Use

Many of the ideas and needs for future use of the device that were suggested by the app administrators may increase the complexity and reduce the user-friendliness of the communication device. Demographic development shows that people worldwide are living longer, and the oldest age group in particular is increasing. Although the new generation of older adults may have good digital knowledge, there will probably be new applications and solutions that will be unknown to the oldest population group over the age of 80. They will therefore have their own challenges related to new devices [45]. In the future, older adults and their families/caregivers could be directly involved in researching digital solutions as part of a user-friendly approach. The findings of this study may also be important for identifying weak spots and intervention points with respect to health services and caregivers in their daily care of and communication with older adults. Future research should address how technology could be used as a tool to combat mental health problems among older adults and how digital communication could be used to uphold social networks for older adults.

4.6. Limitations and Considerations

One consideration for the applicability of the results may be that the app administrators comprise an affluent segment in the population, as they had to purchase the device. Thus, the gains use of this computer device to reduce loneliness and improve food intake among older adults would first benefit older adults with families already possessing more resources than others. However, the findings show the merit of digital technology as a tool to improve conditions for older adults; thus, implementation of such devices in social welfare planning on a societal level should be addressed. Another possible limitation of the reported data is that the results are based on self-reported data and therefore provide biased results. However, the survey was used to explore whether the use of digital technology could be a tool for reducing loneliness and improving food intake among older adults by collecting insights from families and caregivers. Therefore, the app administrators' views and subjective answers to some of the questions provide important information for future use and development of technology.

5. Conclusions

This study shows that app administrators felt the need for better communication with older adults. They suggested that the Komp technology, in addition to facilitating social contact with family, should also be used to facilitate participation of older adults in various networks and social meeting places that help to prevent loneliness and malnutrition. A clear majority of app administrators were in the 40–60 age group, which most likely indicates that they were children of Komp users. However, the presence of younger administrators also implies that the tool is already functioning as a bridging tool between generations. The potential for the use of the digital communication tool lies in the context of a wider interaction within extended families, as well as with external networks.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/jal3010004/s1>, Table S1: Demographic characteristics of Komp users (N = 748) and distribution in the population; Table S2: Distribution of Komp user networks and regular participation in activities by age group (percentages shown are within age groups; whole sample N = 748).

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Institutional Review Board Statement: This study was submitted to the Norwegian Agency for Shared Services in Education and Research, Sikt (formerly NSD), for evaluation of compliance with current legal requirements and research ethics principles (300101). The study was designed and executed in accordance with the guidelines laid out in the Declaration of Helsinki (revised 2008).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data available on request due to restrictions e.g., privacy or ethical. The data presented in this study are available on request from the corresponding author. The data are not publicly available due to data being the property of the project owner, No Isolation, and cannot be shared without permission.

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Conflicts of Interest: The authors are not aware of any biases that might be perceived as affecting the objectivity of this review.

Appendix A

Questionnaire

(Questions marked with * are not included in the paper.)

We want answers from you who are app users and operate a Komp for an older adult called “elderly”. We want to know how you experience the use of Komp. Among completed forms, we draw 5 gift vouchers worth NOK 1000.

- (1) The place of residence of the older user of KOMP?
 - Living at home
 - Nursing home
 - Senior apartment
 - Other
- (2) Gender
 - Man
 - Woman
- (3) Marital status
 - Married
 - Unmarried
 - Cohabitant
- (4) How old is the older one?
 - 70–75
 - 76–80
 - 81–85
 - 86–90
 - over 90 years
- (5) Where does the older person live? * (More answers possible)
 - City
 - Town (over 2000 inhabitants)
 - Village (over 200 inhabitants)
- (6) Network for the older adult (multiple answers possible)
 - Have regular contact with family and friends

- Regularly participates in activities outside the home
 Has little network
 Am alone a lot
 Live far from others
- (7) The meals of the older adult
 Buys own food
 Get the food delivered to your door/home
 Relatives/others buy food for the older adult
- (8) Physical activity for the older adult (Multiple answers possible)
 Participates in organized exercise
 Going on a trip
 Moves little
 Is not active outside the home
- (9) The older adult's use of technology (Multiple answers possible)
 Is an active internet user (online banking, social media)
 Has a smartphone
 Little active internet user
 Does not use other digital tools than KOMP
- (10) COVID-19 Has the corona situation affected the older adult's use of KOMP?
 Used more often
 Used less often
 Used as before
- (11) COVID-19 Has the corona situation led to new areas of use when using KOMP?
 Yes
 no
 If so, in which areas?
- (12) Are you eating any of the meals via KOMP today?
 YES
 NO
- (13) Are shared meals via KOMP something you could think of starting up with?
 YES
 NO
- (14) Would joint meals via KOMP, where older people eat together with you or others, be a good idea to (Multiple answers possible)
 Increase appetite
 Eat more
 Enjoy
 Reduce loneliness
- (15) Would shared meals via KOMP, where older people eat together with you or others, be a good idea? Yes/No
 If YES, describe
 If NO, describe
- (16) * Do you have any physical activities together (e.g., dancing) via KOMP today?
 YES
 NO
- (17) * Would physical activity where the older person exercise together with you or others via KOMP be a good idea to (More answers possible)
 Get in better shape
 Prevent injuries

- Reduce loneliness
- (18) * Would physical activity where the older person exercise together with you or others via KOMP be a good idea? Yes/No
If YES, describe
If NO, describe
- (19) Can other people or networks fill the role of today's App user for meals and physical activity? (More answers possible)
Other seniors in a network?
Pensioners Association,
Voluntary organizations (e.g., Red Cross, Lions, 4H, the National Association)
Other
- (20) Do you think meals and physical activity can create new meeting places for the older adult with the help of KOMP?
YES
NO
- (21) Please give us some ideas on how meals and physical activity can create new areas of use for KOMP?
Describe
- (22) Do you see a potential in the current situation to use KOMP in new ways?
Describe

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