Assessing the Effect of Domotics used as an Assistant to Meal Preparation with People with an Intellectual Disability

Dany Lussier-Desrochers, Yves Lachapelle, and Nancy Leclerc
Department of Psychoeducation
Université du Québec à Trois-Rivières
3351, boul. Des Forges, C.P. 500 Trois-Rivières
Québec, G9A 5H7
e-mail: Dany.Lussier-Desrochers@uqtr.ca, Yves.Lachapelle@uqtr.ca, Nancy.Leclerc@uqtr.ca

Hélène Pigot, Jérémy Bauchet, and Sylvain Giroux
Computer science department
Université de Sherbrooke
2500, boul. De l'Université, Sherbrooke
Québec, J1K 2R1
e-mail: Helene.Pigot@USherbrooke.ca, Jérémy.Bauchet@USherbrooke.ca, Sylvain.Giroux@USherbrooke.ca

***Abstract*— Interventions in all life settings of a person with an intellectual disability makes social inclusion possible. Although access to apartments is an important element to promote social participation, several obstacles limit their access. For this reason, it seems that technology can be of assistance to people in completing their daily tasks. Innovative technology encompasses domotics (house automation). The objective of the research presented in this article is to evaluate the effect of using domotics as an assistant to meal preparation. This research presents new ideas and new results and is directly related to the field of user-centric networking and services and more specifically the user adapted services. Twelve people with an intellectual disability carried out two recipes with and without technological assistance. Results show that people were able to use the assistant and by so doing, decreased the necessary human assistance for doing the task. This research also sheds new light on new intervention methods in home settings.**

Keyword-self-determination; assistive technology; domotics; autonomy; cooking.

I. INTRODUCTION

Many authors consider the fact of living in a home environment to be essential for the promotion of social participation of individuals [1][2]. Currently, research and intervention settings are working together in order to develop mechanisms that encourage access to different residential settings for people with an intellectual disability [3][4]. Unfortunately, for them, access to this type of apartment is riddled with obstacles. Foremost, for several people with an intellectual disability, access to apartment living is highly limited due to the necessary abilities and skills required to perform certain tasks. Thus, the significant limitations regarding reasoning, planning, problem solving and abstract thought may have considerable impacts on their ability to complete complex house tasks. Moreover, significant limitations regarding adaptive behaviours jeopardise their possibility of having access to these apartments. Overall, integration into these settings requires one to acquire and apply a certain number of functional and adaptive abilities (meal preparation, house cleaning, ensure the safety of his/her home and of his/herself, etc.) [1]. Certain researchers consider it possible for people with an intellectual disability to overcome many of these obstacles and to participate actively within their community with the assistance of assistive technologies [5].

The article first presents the use of technology in the daily lives of people with an intellectual disability. The following section presents the research conducted up to now on the use of automation to support the preparation of meals. Thereafter, the objectives of the research, the proposal and participants are described. The results obtained are explained and discussed in the final sections of the article.

II. ASSISTIVE TECHNOLOGIES IN DAILY LIFE

Proulx et al. [6] describes a study that evaluated different aspects of apartment life for people with an intellectual disability. Results show that the task of preparing a complete meal for people with an intellectual disability who live in an apartment is the most difficulty. For these individuals, meal preparation is generally the daily life activity that requires the most assistance [7]. Therefore, meal preparation plays an important role in people's lives.

Several measures are used to support people with an intellectual disability in the preparation of their meals. In rehabilitation settings, illustrated recipes in pictogram style, are commonly used. In the past few years, these visual aids have gradually been transferred onto handheld devices. These task assistants not only display each step of the recipe but also use picture prompting in order to offer people the proper feedback and reinforcement in carrying out their task. These systems are particularly helpful in assisting people in fulfilling their daily life activities and in reducing the assistance needed to perform a task, which in turn, encourage self-determination [8]. The progress made in the field of data processing as well as access to inexpensive cameras and video editing software have also made it possible to use videotaping to assist meal preparation. The results of these video methods, which have been developed and tested in the past few years, show that these technologies reduce the number of mistakes made during recipe-making and promote learning that is maintained over a period of several weeks [9][10]. Finally, it is important to mention that studies

 ISBN: 978-1-61208-232-5

showing the effectiveness of these technologies had individuals follow simple recipes (e.g., reheating a dish in the microwave, making a sandwich, and preparing cookies and deserts).

III. DOMOTICS AS A NEW APPROACH TO MEAL PREPARATION ASSISTANCE

While these technologies are being used to assist meal preparation in home settings, domotics makes it possible to create safe environments which ensure continuous support for the initiation and realisation of routines in residential contexts [11].

Most research evaluating the effects of domotics have been carried out in the fields of information technology and engineering and have focused primarily on technology development intended for older people and people with physical disabilities [12][13][14]. In physical rehabilitation settings, domotics is especially used for surveillance and injury prevention with the elderly and disabled people, people with physical disabilities or with craniocerebral traumas.

The purpose of the research, until now, has been to use domotics to carry out certain tasks for the person. Little research has focused on specifically evaluating the application of domotics with the perspective of self-determination, that is to say, assist the person in the successful completion of his/her daily tasks. Recent research shows that this type of environment encourages greater independence (meals, choice of daily activities) and a sense of control over the achievement of daily activities [15]. Moreover, users are generally quite satisfied and perceive ubiquitous technology as meeting their needs and giving them greater control over the achievement of their activities [15]. Results from these initial studies also tend to show that environments using domotics promote certain conditions such as safety, autonomy, independence, a better quality of life and community integration and are all conducive to the expression of self-determination, which turn encourage the social participation of individuals [15][16]. In social and human sciences, little research has studied the application of these technologies with human beings. Until now, only two studies on the application of domotics in a residential setting have been carried out with people with an intellectual disability [5][17]. Consequently, there is no doubt as for the application of these technologies with people with an intellectual disability.

IV. THE STUDY

The next sub-sections present the research objectives, the experimental site, the research proposal used and the method of analysis.

A. Study objectives

In one of the initial studies on the use of domotics with people with an intellectual disability, this technology was studied from the angle of self-determination. The general objective of this study is to perform an initial evaluation of the contribution of domotics when used as a meal preparation assistant for people with an intellectual disability. The research also pursues three specific objectives: a) to examine the effectiveness of domotics in helping a person complete a recipe; b) to verify if there is a difference in the length of time required to complete a recipe using domotics; c) to examine if the use of domotics reduces the frequency as well as the type of human support offered to the person in the completion of a recipe of a more complex nature.

The choice of meal preparation is strategic. On a cognitive level, meal preparation involves many challenges particularly in relation to planning, reasoning, problem solving and memory. This daily life task allows different assistance methods to be tested. This study is amongst the very few that evaluate the applicability of domotics with people with an intellectual disability.

B. Description of the experimentation site and of the technology

Research was carried out at the DOMUS laboratory. This laboratory, situated at the University of Sherbrooke, is equipped with an apartment that uses domotics, which is furnished with basic domiciliary equipment. For the purpose of this study, an assistant for meal preparation was created and set up in the apartment. This assistant is the result of collaborative work between specialists stemming from different fields (occupational therapy, psychology, special education, design and computer science) [11]. The dynamic contextual assistant is composed of three main components.

Sensors. First of all, electromagnetic sensors, movement detectors and tactile carpets collect information on the activities performed by the participant. All of the information collected by the sensors is analysed by the Archipel software.

Assistance interface. The second system component is the assistance interface, which is presented on a tactile screen placed on a workable kitchen surface. When using the tactile screen, the person may press the buttons “before” and “next” to visualise accomplished steps or simply to see the following steps, which is helpful to plan the preparation of the recipe. Finally, the person may, if need be, press on the “video” button for video prompting (visualise a short video sequence) that shows explicitly how to perform the task.

Object locator. Locating objects and ingredients in the kitchen is an important component in ensuring the successful preparation of a recipe. The installed interface in the apartment can help the person find objects in his/her environment. When the person presses the button for the localisation assistance, a home menu displays categories of objects and ingredients. When the person presses on the desired object, the system activates a small diode integrated in the doors and drawers to indicate exactly where the object is located.

Four elements guided the development of this assistant to help individuals follow recipes. First of all, the graphic elements of the interface stem from the Pocket Coach software marketed by AbleLink technologies and were tested on people with an intellectual disability [18]. Secondly, researchers of this study also followed the recommendations of researchers concerning the creation of interfaces

 ISBN: 978-1-61208-232-5

specifically geared at a clientele with an intellectual disability [19][20]. Finally, the fact that research results [21][22] showed that video prompting is effective for teaching culinary tasks to a population with an intellectual disability convinced researchers to add a concrete assistance standard using video sequences.

C. Participants

The research was comprised of twelve participants. Sampling was done according to an accidental non-probabilistic method. Participants were selected according to three inclusion criteria: 1) adults (18 years and over) with a mild intellectual disability without an associated physical disability or mental health problems; 2) living in an autonomous and supervised apartment or in foster homes; 3) regularly participating in meal preparation. Out of the twelve participants, 7 were women and 5 were men.

D. Design, variables and experimental procedure

The research uses 2x2 factorial design (with and without technology). This design makes it possible to control potential bias sources associated to the internal validity of the research such as the learning effect and familiarisation with the environment and with the type of recipe. Participants were randomly divided into the two experimental groups. Thus, depending on the group assignment, persons in group 1 carried out an A-B plan (Time 1 without technology / Time 2 with technology) and persons in group 2 carried out a B-A plan (Time 1 with technology / Time 2 without technology). In condition A, the participant prepares a recipe without the help of domotics. Condition B corresponds to the introduction of the independent variable (assistive technology using domotics) and requires the participants to carry out routines with the help of the computer system. In both conditions, the researcher is present and offers help to the participant when needed. The level of help offered by the researcher is recorded (dependent variable). In both conditions, the participant has at his/her disposal a paper version of the recipe that describes the ingredients and the procedure to follow.

For the purpose of the research, the participants spent three days at the DOMUS laboratory apartment of the University of Sherbrooke. Every day, the participant must spend between 1 to 3 ½ hours for experimentation purposes. The first day constitutes a preparatory phase. This phase is not part of the experimental design and its goal is to introduce the participant to the functioning of the computer and apartment components. During this preparatory phase, the researcher introduces the participant to the functioning of the tactile screen. In order to do so, the researcher plays three games of tic-tac-toe with the participant. The researcher then prepares a pancakes recipe with the participant. During the preparation, the researcher intentionally makes mistakes in order to demonstrate to the participant how to react to signals given out by the apartment. The two following days are devoted to experimentation and data collection. As soon as the participant arrives, the researcher explains the recipe to be carried out, the steps to be accomplished and the expected end result. Both recipes are relatively complex. Participants must prepare either spaghetti or macaroni from scratch. Thus, they must cut and cook the vegetables, add the meat, prepare the sauce and cook the pasta. Both recipes have the same number of steps (n=12), use the same ingredients (except for the type of pasta) and have the same cooking time. The last step is the only difference. The researcher also informs the participant as to whether he or she must follow the recipe with or without the computer's assistant.

E. Analysis of results

A camera on the ceiling films each experiment. The video sequences are then viewed in order to identify precisely the help given by the researcher. Help behaviours and participant reactions are listed in an Excel document and compiled for each participant along with the precise time that help was given and in which manner for each condition. In order to have a more accurate idea of the level of help needed to complete a recipe, help behaviours are coded according to four categories taken from the support intensity scale of the American Association on Mental Retardation [23], they are: monitoring, verbal prompting, gestual prompting, full physical assistance. For condition B, another category was added: assistance with the technology. In order to ensure data validity, counter-coding was done and the level of agreement between-judges was considered satisfactory. Descriptive analyses are then carried out (percentage, average, standard deviations). When it is statistically possible, paired samples t tests are used in order to examine if differences between means are significant.

V. RESULTS

The overall results are described in the next sub-sections.

A. Accomplishment time and help given by the researcher

Participants were all able to complete the recipes in both conditions. The average time to complete the recipe with the technology is 72.00 minutes (SD = 15.06) and without the technology is 70.83 minutes (SD = 12.66), $t(11) = 0.34$, $p = .74$ (two-tailed).

In general, we observed a considerable decrease in the help offered by the researcher for the completion of a recipe when we compared the conditions with and without the use of technology. Thus, when the person carries out the recipe without the technology, the researcher must offer assistance on an average of 40.58 times (SD = 24.25) compared to the situation with the technology where required help falls to 18.33 times (SD = 11.30), $t(11) = 4.06$, $p = .002$ (two-tailed).

The detailed analysis data of the types of assistance offered to participants for each condition are displayed in Table 1. The major portion of the assistance offered by the researcher for the accomplishment of the recipe can be found under verbal prompting. Verbal assistance given in the domotic condition was 91.9% and 86.2% in the condition without domotics. The analysis of the video sequences shows that the researcher essentially gave guidelines, answered participants' questions or confirmed that the actions were adequate. The second most used assistance by participants was gestual prompting. The analysis shows that the

researcher mostly pointed out the location of objects and ingredients in the kitchen. The other types of assistance were used less by participants (monitoring and physical assistance). However, these types of assistance were also reduced by more than half in the domotic condition.

TABLE 1. SUPPORT PROVIDED FOR THE COMPLETION OF THE RECIPES WITH AND WITHOUT DOMOTICS

Domain	With domotics (n = 12)		Without domotics (n = 12)	
	M	*SD*	*M*	*SD*
Monitoring	.17	.39	.33	.47
Verbal prompting	14.25	19.19	34.92	21.32
Gestual prompting	.67	.78	3.67	4.01
Full physical assistance	.50	.80	1.67	1.07
Total help for recipes	*15.59*	*10.07*	*40.58*	*24.25*
Technology	2.75	2.89	---	---
Total help provided (recipe, technology, unexpected)	*18.33*	*11.30*	*40.58*	*24.25*

The video sequencing analyses of condition B show that people use the different components of the assistant to complete the tasks. The two components most often used are the picture prompting and the object locator. Participants use picture prompting to see each step concretely in order to complete the recipe. The participants then imitate the behaviour presented on the picture. Nearly all participants used the object locator to find utensils and ingredients. Many used it systematically to locate all of the necessary utensils and ingredients for the accomplishment of their recipe. The analysis also shows that many participants take great pleasure in using this function. Video prompting is the less frequently used function by participants. In this condition, the researcher gave a certain type of additional assistance specifically related to the technology. The analysis of results shows that in this condition, the researcher helped the participants 2.75 times on average for the use of different domotic functions built into the apartment. The detailed analysis shows that the assistance given is related to the use of the video and the buttons on the interface as well as the comprehension and interpretation of verbal messages and light signals.

However, an important variation in the intensity of the use of the technological assistance for each participant is noticed in the standard deviation.

B. Results related to individual scores of participants

The research sample was heterogeneous in relation to kitchen abilities. The high standard deviations clearly illustrated this situation. Indeed, the analysis of individual scores indicates a very important variability in the intensity of the support given to participants.

Results show, with the exception of two participants (#7 and #11), that all other participants were given less support when using the assistant to carry out tasks. These two participants belong to group 2 (with domotics / without domotics).

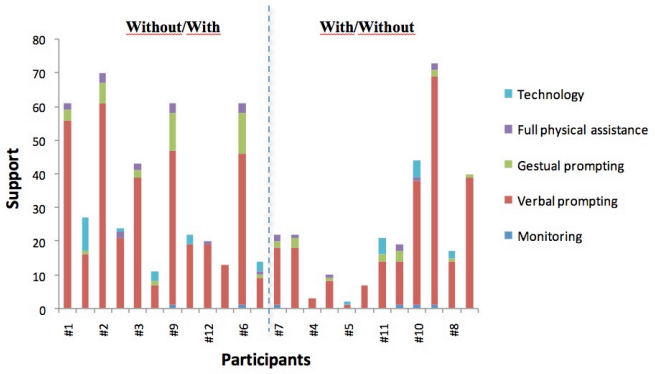

Figure 1. Indivual scores for the support provided for the completion of the recipes with and without domotics.

As for candidate #7, we notice a consistency as to the quantity of overall support given by the researcher with (n = 22) and without technology (n = 22). For this candidate, the most frequent type of support given is verbal. A more detailed analysis of the videos shows that for both conditions, the candidate requested, on several occasions, the approval of the researcher (for example, she asked the researcher if the quantity of the ingredient was correct or if she was doing the task in the correct manner). Concerning candidate #11, we noticed a decrease in the support offered when she did not use the assistant to carry out her tasks (with n=21 / without n=19). However, in the domotic condition, the video sequencing analysis shows that the researcher intervened 5 times with the candidate regarding technology. The help offered was given in relation to the functioning of the tactile screen. Thus, if we only focus on the assistance given for the recipe, we notice an increase in the assistance when comparing the condition with technology (n = 16) and without technology (n = 19), which is also the case for all the other candidates.

C. Results according to the group membership of participants

The use of the 2x2 factorial design made it possible to control the influence of certain variables. The analysis of the results according to group membership represents the situation well. These results are presented in Figure 2.

The candidates in group 1, follow the recipe without domotic and then with domotic (group without/with). In this condition, help given is notably less in the condition without domotics (M = 52.67; SD = 18.27) and with the use of domotic (M = 18.50; SD = 6.65). Concerning this condition, we observed a decrease of verbal assistance between the conditions without (M = 44.33; SD = 14.75) and with (M = 14.17; SD = 5.53) and an important decrease in the number gestual prompting given to persons between the conditions without (M = 5.67; SD = 4.93) and with (M = 0.50; SD = 0.55). In group 2, the conditions are reversed. It is in this condition that the difference is the smallest between both

 ISBN: 978-1-61208-232-5

conditions; with technology (M = 18.17; SD = 15.38) and without technology (M = 28.50; SD = 24.70).

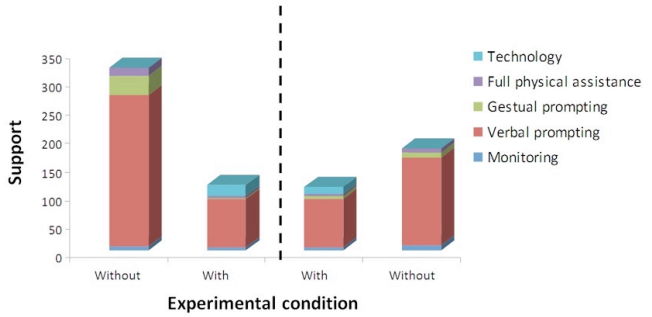

Figure 2. Total support offered for both experimental conditions.

Finally, results show that the help offered is similar and this, regardless of whether the domotic is used first (M = 18.50; SD = 6.65) or secondly (M = 18.17; SD = 15.38). This therefore shows constancy for this intervention method.

VI. DISCUSSION

The results obtained identify the contributions of an innovative technology used with people with an intellectual disability for the preparation of recipes. The discussion will refer to the study's three objectives.

A. Effectiveness of domotic as an assistant for people with an intellectual disability when in carrying out a recipe

The proposed technology is innovative and until now, few studies reviewed the implementation of this technology with people with an intellectual disability. This study wanted to verify if these persons were able to use this type of technological support and gain certain benefits. The study shows that these persons were able to use the assistant to prepare recipes and understand the different options offered. All participants used the picture prompting and the object locator. Even though several studies show the positive impacts of using video prompting, participants seldom used this method of assistance [22]. It seems that several did not know how to activate this function. Researchers must then reflect on ways to access more easily this type of assistance on the interface.

The complexity of the technology led us to believe that the participants would require a great deal of assistance to use this technology. Results show that the preparatory period was in itself sufficient for participants to comprehend the functioning of the tactile screen as well as the assistant for the preparation of the recipe. Our experiment showed that tactile screens are effective in simplifying interactions with the computer.

B. Impacts on the time of completion of the recipe

Results related to the time of completion of the recipe show a minimal difference between with and without technology. Hence, the technology in place does not lengthen the time devoted to meal preparation. This element is important for the future of this technology. Indeed, the technologies proposed to people should not make task completion more difficult. This element could bring people to lose interest.

C. Effect on the necessary human assistance for the completion of a complex recipe

This study is audacious; a relatively complex technology was combined with a recipe with a certain degree of difficulty. This study differentiates itself from other research that generally uses simple recipes such as preparing sandwiches, reheating meals in the microwave, etc. Nevertheless, this study shows that this technology does reduce the human assistance needed by the person to follow a recipe. Results of this study are similar to that of previous studies exploring the effect of technology as an assistant to the completion of tasks in a home setting [22][24][25][26]. The decrease in assistance is essentially at a verbal and gestual prompting level. The analysis of experimental conditions shows a certain stability of the technology. Thus, whether it is used in time 1 or in time 2, the level of human assistance remains relatively stable. Future studies should look into the effects of this technology when applied repeatedly to examine whether this tendency is maintained over time or if there is an observable learning effect after several consecutive uses of the assistant.

Finally, we cannot dismiss the heterogeneity of the sample, which had an important impact on the results obtained. Future research should be done with a sample of people that have similar abilities in carrying out a recipe. We believe that the success in applying this type of technology is largely determined by the identification of the needs and abilities of future users.

D. Global effects of the technology

Several effects could not be explained. On the other hand, interactions with the participants and informal discussions with them allow us to believe that there is an important potential for these technologies in relation to the dimensions of self-determination. Results clearly show that the assistant to help individuals follow recipes had a positive impact on the behavioural autonomy of participants.

VII. CONCLUSION

The research on domotics intended for people with an intellectual disability is an innovative and promising research field. It appears that SDST (have beneficial effects on the lives of people with an intellectual disability, facilitating inclusion and the fulfillment of the role of an active citizen within the community. According to us, the development of this research field is a first step towards the implementation a new innovative residential model in the next few years. This solution will possibly make it easier to save money for home care services and diversify the range of services offered. Research will indisputably have concrete repercussions on the life of people with an intellectual disability.

REFERENCES

[1] P. Morin, D. Robert and H. Dorvil, "Le logement comme facteur d'intégration sociale pour les personnes classées

malades mentales et les personnes classées déficientes intellectuelles," Nouvelles pratiques sociales, vol. 14, Dec. 2001, pp. 88-105.

[2] R. McConkey, S. Abbott, P. N. Walsh, C. Linehan and E. Emerson,"Variations in the social inclusion of people with intellectual disabilities in supported living schemes and residential setting, " Journal of Intellectual Disability Research, vol. 51, March 2007, pp. 207-217, doi: 10.1111/j.1365-2788.2006.00858.x

[3] J. Mansell, B. Ashman, S. Macdonald and J. Beadle-Brown, "Residential care in the community for adults with intellectual disability: needs, characteristics and services," Journal of Intellectual Disability Research, vol. 46, Nov. 2002, pp. 625-633, doi: 10.1046/j.1365-2788.2002.00440.x

[4] P. K. S. Wong and D. F. K. Wong, "Enhancing staff attitudes, knowledge and skills in supporting the self-determination of adults with intellectual disability in residential settings in Hong Kong: a pretest-posttest comparison group design," Journal of Intellectual Disability Research, vol. 52, March 2008, pp. 230-243, doi: 10.1111/j.1365-2788.2007.01014.x

[5] Y. Lachapelle, D. Lussier-Desrochers and H. Pigot, "Des TIC en soutien à l'autodétermination des personnes présentant une déficience intellectuelle," Revue québécoise de psychologie, vol. 28(2), 2007, pp. 111-123.

[6] J. Proulx, L. Dumais and Y. Vaillancourt, "Le logement à soutien gradué: Évaluation d'un projet prometteur pour les personnes ayant une déficience intellectuelle," (Cahiers du LAREPPS, No 07-09). Montréal: Laboratoire de recherche sur les pratiques et les politiques sociales (LAREPPS) - Université du Québec à Montréal (UQAM), 2007.

[7] OPHQ, "La participation sociale des personnes handicapées au Québec: les activités de la vie quotidienne: la vie communautaire," Proposition d'une politique gouvernementale pour la participation sociale des personnes handicapées. Drummondville: Office des personnes handicapées du Québec, 2007.

[8] G. E. Lancioni, M. F. O'Reilly, P. Seedhouse, F. Furniss and B. Cunha, "Promoting Independent Task Performance by Persons With Severe Developmental Disabilities Through a New Computer-Aided System," Behavior Modification, vol. 24, Oct. 2000, pp. 700-718, doi: *10.1177/0145445500245005*

[9] R. A. Rehfeldt, D. Dahman, A. Young, H. Cherry and P. Davis,"Teaching a simple meal preparation skill to adults with moderate and severe mental retardation using video modeling," Beharioral Interventions, vol. 18(3), 2003, pp. 209-218.

[10] R. Shipley-Benamou, J. R. Lutzker and M. Taubman, "Teaching daily living skills to children with autism through instructional video modeling," Journal of Positive Behavior Interventions, vol. 4, July 2002, pp. 166-177, doi: *10.1177/10983007020040030501*

[11] H. Pigot, D. Lussier-Desrochers, J. Bauchet, S. Giroux and Y. Lachapelle, "A Smart Home to Assist Recipe Completion," In A. Mihailidis, J. Boger, H. Kautz and & L. Normie (Eds.). Technology and Aging, Selected Papers from the 2007 International Conference on Technology and Aging (pp. 35-42). Amsterdam : IOS Press. (2008)

[12] K. Chapman and K. McCartney, "Smart homes for people with restricted mobility," Property Management, vol. 20(2), 2002, pp. 153-166, doi: 10.1108/02637470210428356

[13] R. Cucchiara, C. Grana, A. Prati, and R. Vezzani, "Computer vision system for in-house video surveillance," Intelligent distributed surveillance systems, vol. 152(2), 2005, pp. 242-249.

[14] H. Eriksson and T. Timpka, "The potentiel of smart home for injury prevention amoumg the eldery," Injury Control and Safety Promotion, vol. 9, Aug. 2002, pp. 127-131, doi: 10.1076/icsp.9.2.127.8694

[15] S. Martin, C. Nugent and A. Porter-Amstrong, "User perspectives: Living and working with in a "Smart Home" environment," In S. Giroux & H. Pigot (Eds.). From smart homes to smart care (pp. 33-41). Amsterdam : IOS Press. 2005

[16] J. Lundell, "Ubiquitous computing to support older adults and informal caregivers," In S. Giroux & H. Pigot (Eds.). From smart homes to smart care (pp. 11-22). Amsterdam : IOS Press. 2005

[17] S. Junestrand, G. Mollin, K. Tollmar and U. Keijer, "User Study of Video-Mediated Communication in the Domestic Environment With Intellectually Disabled Persons," International Journal of Human-Computer Interaction, vol. 15(1), 2003, pp. 87-103.

[18] D. K. Davies, S. E. Stock and M. L. Wehmeyer, "A Palmtop Computer-Based Intelligent Aid for Individuals With Intellectual Disabilities to Increase Independent Decision Making," Research & Practice for Persons with Severe Disabilities, vol. 28(4), 2003, pp. 182-193.

[19] D. K. Davies, S. E. Stock and M. L. Wehmeyer, "Enhancing Independent Internet Access for Individuals with Mental Retardation through Use of a Specialized Web Browser: A Pilot Study," Education and Training in Mental Retardation and Developmental Disabilities, vol. 36(1), 2001, pp. 107-113.

[20] C. M. Okolo, C. Bahr and H. Reith, "A retrospective view of computer-based instruction," Journal of Special Education Technology, vol. 12, 1993, pp. 1-27.

[21] T. B. Graves, B. C. Collins, J. W. Schuster and H. Kleinert "Using Video Prompting to Teach Cooking Skills to Secondary Students with Moderate Disabilities," Education and Training in Developmental Disabilities, vol. 40(1), 2005, pp. 34-46.

[22] J. Sigafoos, M. O'Reilly, H. Cannella, M. Upadhyaya, C. Edrisinha, G. E. Lancioni, et al., "Computer-Presented Video Prompting for Teaching Microwave Oven Use to Three Adults with Developmental Disabilities," Journal of behavioral education vol. 14, Sept. 2005, pp. 189-201, doi: 10.1007/s10864-005-6297-2

[23] J. R. Thompson, B. R. Bryant, E. M. Campbell, E. M. Craig, C. M. Hughes, D. A Rotholz, et al., "Supports Intensity Scale (SIS-F)," Wahinton,DC: American Association on Intellectual and Developmental Disabilities, 2008.

[24] G. E. Lancioni and M. F. O'Reilly, "Teaching food preparation skills to people with intellectual disabilities: A literature overview," Journal of Applied Research in Intellectual Disabilities, vol. 15, Sept. 2002, pp. 236-253, doi: 10.1046/j.1468-3148.2002.00122.x

[25] G. E. Lancioni, E. Van den Hof, F. Furniss, M. F O'Reilly and B. Cunha, "Evaluation of a computer-aided system providing pictorial task instructions and prompts to people with severe intellectual disability," Journal of Intellectual Disability Research, vol. 43, Feb. 1999, pp. 61-66, doi: 10.1046/j.1365-2788.1999.43120165.x

[26] L. Mechling, "Use of video prompting, via a portable DVD player, laptop computer, or PDA as self-prompting devices for persons with moderate intellectual disabilities," ATIA Orlando: Showcasing Excellence in Assistive Technology, ATIA 2009. Orlando, Fl, USA.

 ISBN: 978-1-61208-232-5