

# Integrating ICT in Nutrition Education during Digital Era

Sakshi Mehta\*, Swati Vyas

Department of Home Science (Foods & Nutrition)

IIS (deemed to be University), Jaipur

## Abstract

Childhood has traditionally been referred to as a "golden age." The foundations for a child's cognitive, behavioural, and overall development are set in the earliest years of life, which also influence their survival in life. Children at this period are greatly influenced by their surroundings and the people in them. From early childhood through adolescence, parents have a significant impact on the types of food available and dietary habits. When children are of school age, it is essential that both parents and children receive education on healthy eating habits. This is because behaviours acquired at this age will last and benefit children until they are completely grown. Integrating Information Communication Technology (ICT) in nutrition education during this digital era positively influence learning abilities, nutritional intake and promote healthy nutrition behaviour among children. The paper is based on the review of the researches making effective use of ICT and its integration in schools to provide nutrition education conducted from 2015-2020. Adequate nutrition application is necessary during foundation years as children contribute to future man power which can improve the socio-economic conditions. However, the present scenario reflects that sedentary lifestyle with energy imbalance are root cause of increasing obesity as children consume more calories.

**Keywords:** Digitalisation, Healthy Food Choices, ICT, Information, Communication and Technology, Nutrition Education, School Going Children

## Introduction

The 21st century is often regarded as an era of Technology (Grabe and Grabe, 2007). Latest insights reveal that Integration of Information, Communication, and Technology (ICT) is contemplated as the most important components in remodeling the nation for the upcoming evolution and lays foundational blocks of modern era and also assist teachers by replacing worldwide conventional teaching methods with advance technology (Hatlevik and Arnseth, 2012). UNESCO 2002, regards ICT refers to a combination of "Informatics technology" and other innovations, particularly communication technology. In addition to preparing students for the current digital era, ICT has the potential to innovate, speed up, enhance, and deepen skills (Amin, 2013). The primary goal of ICT integration in education is to strengthen and improve the consistency, accessibility, and cost-effectiveness of instruction delivery to students, thereby preparing them to face globalization challenges during this period (Albirini, 2006).

The use of IT communication in everyday classroom

programmes is related as part of ICT in education. ICT is considered as a part of core education as it has undoubtedly affected nutrition education in various ways by improving quality of education and teaching methods by enhancing learning and research (Yusuf, 2005). The incorporation of ICT in education prepares students for lifelong learning, enhances learning quality, improves information communication effectiveness, and opens up a wide range of flexible teaching and learning opportunities (Ghavifekr and Rosdy, 2015). ICT is defined as all information-handling tools contained in a wide range of products, software, and services used to generate, process, distribute, and exchange data. In this generation, ICT is perhaps the most potent weapon of dynamic change in our society. Communication, trade, manufacturing, and services are among the aspects of human endeavors that it is imparting and improving (Bhattacharjee and Deb, 2016).

## Use of ICT in enhancing quality and accessibility of Nutrition Education

Education related to nutrition plays an important role in increasing an individual's understanding and familiarity

\*Corresponding Author Email : sakshi8796@gmail.com

with the role of nutrition, which in turn helps an individual foster a healthy lifestyle. Nutrition Education related Theories may serve as a link between motivation and attitude change (Kupolati *et al.*, 2018). Poor eating patterns and sedentary lifestyle have been linked with increased risk of chronic health problems in later years of life (Hall, 2015).

Researches indicate school meals have greater impact on child's cognitive function, concentration, energy and academic performance. School environment and early years of life help in positively shaping child's eating behaviours and food choices. Nutrition education and Health promotion should be incorporated in school curriculum and new ways should be explored to encourage children to opt for healthier food choices (Debnath and Agrawal, 2016).

Tallon *et al.*, conducted a study in 2021 which involved technology-based school interventions to assess the impact of school-based nutrition education programmes on adolescents' knowledge acquisition and behaviour change in relation to nutrition. The study reported overall positive nutrition-related outcomes, though these results did not last. This kind of intervention programmes can leverage technology-based approaches; however, the interventions must be improved if long-lasting outcomes are to be obtained.

In a classroom environment, various approaches such as presentation, role-playing problem solving, field trips, and social drama brainstorming can be used. However, ICT uses latest knowledge to face current challenges and problems in field of education and thereby addressing positively the contemporary issues in acceptable manner (Johnson *et al.*, 2016).

Nutrition education encompasses all aspects of food, including purchasing, preparing, serving, and preserving food, as well as the chemical composition of food, the roles of diverse food nutrients in the body, calorie counting, and the type and quantity of food nutrients required by people of all ages, based on their health and activity levels. Nutrition Education encourages the use of environmentally friendly methods of harvesting, preparing, and serving meals rather than destructive food processing techniques. Nutrition Educators (Teachers, Anganwadi Workers, Nutrition Counsellors) use computers and other information and communication technologies to document, lead, guide, and educate beneficiaries about basic theories. Food and nutrition education is made more exciting and fascinating by the use of information and communication technologies.

ICT has expanded the versatility of education delivery to students, enabling them to access information at any time and from any place (Amin, 2013). PowerPoint presentations, emails, audio visual aids, interactive games, artistic events, audiocassettes, and posters, among other types of ICT content relevant to education, have been used in education for a variety of purposes. ICTs contribute significantly in the extensive, rapid, and low-cost implementation of nutrition-related interventions (Drigas and Karyotaki, 2013).

According to scientific evidence, using ICT strategies in the formulation and construction of a nutrition education programme with an emphasis on improving cooking skills could result in a better diet quality as more home-cooked meals are utilized. A decline in cooking skills is experienced that is why people are shifting from home-cooked meals to prepared foods because of wide availability, cheap prices of convenience foods, socioeconomic status and limited cooking skills. Education programmes and nutrition interventions deals with individual's physical and psychological health promoting healthy eating behaviors. While raising self-awareness and self-efficacy levels counseling and other factors such as manual, visual, dietary intake along with activity levels and total energy expenditure readings are to be considered. All individuals are trained for behaviour change by analysing their lifestyle habits and nutritional intake with full support and guidance for long term engagement. Conventional nutrition education intervention programmes have previously proven ineffective due to the content taught in classes. These programmes primarily aim to educate people about food characteristics and the health benefits related to food and nutrient consumption. But new innovative strategies can be worked out by incorporating ICT which can further make the entire implementation procedure more effective and thereby ensuring better retention.

### **Review**

In the view of some divergent thoughts, a review on the research studies on ICT integration in nutrition education conducted worldwide was undertaken. The review was carried out not only for ICT integration in nutrition education but its uses in enhancing quality and accessibility of the entire process. Debnath and Agarwal conducted a study in 2016 to see how nutrition related to education and dietary modification affected the health and nutritional status of school going children. They discovered that dietary modification and nutrition intervention had a positive impact on the health and nutritional profile of the case group when compared to the control group. By giving optimal dietary shifts and

nutrition education to the experimental group via a 45-minute dietary adjustment session scheduled for five days in a week for a month, and the beneficiaries showed an improved health status in relation to the controls. The study's main finding was that providing nutrition instruction to children at an early age empowers them to improve their nutritional status for the rest of their lives. On the contrary the control group showed no change in anthropometric as well as dietary status after a month of intervention. For nutrition programmes to be impactful, there must be sufficient time, adequate knowledge transfer, sufficient resources, appropriate teaching materials, and teacher training. School Climate, social and physical conditions, including schools, can influence health attitudes and behaviours both directly and indirectly.

The effect of nutrition education promotion and healthy eating habits were investigated by Hu *et al.*, in 2009 on School going children. The dietary knowledge, behaviours, and eating practices of the parents were studied. The experimental group's children and parents attended nutrition education programmes once a month. The children's anthropometrics and diet-related behaviours, as well as their parents' dietary skills and attitudes, were measured at baseline, 6 months (mid-term), and 1 year (final). Baseline demographic and socioeconomic data were also gathered. When compared to controls, the prevalence of unhealthy diet-related behaviours in children decreased significantly, while the prevalence of good lifestyle behaviours increased. In contrast to the control group, the experimental group's dietary behaviours toward diet planning for their children shifted markedly. However, there were no statistically significant differences between the two classes in terms of children's height, weight, height-for-age Z-score, and weight-for-age Z-score.

A nutrition education programme was developed to help children improve their chewing habits. In Japan, four kindergarten groups were studied, one of which obtained educational programme both in the class and at home (Group A), and the other three of which obtained educational programme only in the classroom (Group B). For five weeks, the instructional programme was incorporated into the regular curriculum of the classes. The curriculum included activities such as storytelling with large graphic novels, conscious chewing while eating lunch, singing songs with expressions, and greetings before and after meals (both groups). Group A also used a paper book, and the leaflet included knowledge to assist parents and introduces the curriculum to their children at home. Before and after

action, chewing patterns were evaluated. According to the findings, this approach could be used to improve chewing habits in young children even if their parents are not actively involved (Sato *et al.*, 2016).

Koch and Hägglund, in 2009 brings to light a growing body of cross-disciplinary studies on the use of information technology, sensor technology, and information systems to provide treatment to older people, such as diet, physical exercise, and medication. The perspectives of the elderly population about their treatment seem to vary depending on their stage of ageing as well as their gender.

A study was conducted by Ruzita *et al.*, 2007 to see how nutrition awareness, mindset, and practice of 8-year-old schoolchildren changed after they received nutrition education. The intervention group included 237 children, and the control group included 181 children who did not receive the nutrition education package. The three-week nutrition education programme included a video viewing session and a comic book reading session, as well as classroom activities and exercise questions to keep participants engaged. Children were given awareness, attitude, and practice questionnaires before (pre-intervention) and after (post-intervention) obtaining nutrition education. The findings showed that the intervention group's nutrition awareness score improved dramatically. Throughout the study period, however, neither group's diet practice score improved significantly. At the pre, post, and follow-up exams, there were no major improvements in the control group's awareness, attitude, or practice ratings. Finally, this research concluded that a successful nutrition education program had a positive effect on children's nutrition awareness, attitude, and healthy eating habits.

Lewis and Burton-Freeman argued in 2010 that consumers' as people's personal interest in their own health status grows, information technology influences their food preferences. Phones, for example, may monitor daily nutrient intake and measure a consumer's nutritional requirements. Furthermore, devices such as the body bug can track your overall energy consumption throughout the day and send it to an online database, which can provide you with the information you need to meet your body weight goals.

Bickmore *et al.*, in 2011 introduced an ontology of health behaviour modification that can be used to promote healthy eating habits. The notable effectiveness of this media-based intervention can be attributed to its ability to mimic the behaviour of an experienced counsellor, as well as its reusability and interoperability. Patients'

wellness behaviour change apps may become a powerful health therapy tool in this way, with the cost of dissemination minimised.

### Suggestions

It is suggested that educators involved in dissemination of nutrition education concept like teachers, nutrition counselors, anganwadi workers etc should be given sufficient training to become proficient users of educational technologies and various services available on google and other platforms which can be used for designing and development of various teaching aids thereby ensuring the educational sessions to be more interesting. However, implementation phase can be better designed by using facilities such as Zoom, Google Meets, Teams, and others, as the modern age necessitates tech-savvy and highly qualified teachers. Such techniques not only contribute to higher order thinking skills, but also provide students with more innovative and personalized options for articulating their conceptions. When educators are technologically literate and qualified to use ICT, students are better prepared to deal with the ongoing technological change in society and the workplace. Government should frame policies to ensure that not only schools but anganwadi centers have required accessibility to ICT infrastructure including safe and secure internet access, power supply solutions, and security measures like filters and web blockers. Integration of ICT in the curriculum is required for effective implementation, and the curriculum should be redesigned to instill food and nutrition-related behaviours in schools. Digital content must be created in local languages and represent the culture of the region.

### Conclusion

The purpose of this literature review was to investigate the critical role of information and communication technology (ICT) in food and nutrition education. The use of information and communication technology (ICT) has a significant impact on the teaching-learning process by making learning enjoyable and entertaining and by ensuring educational quality and accessibility; learning inspiration and providing positive educational atmosphere. ICTs in education have a good impact on promoting adoption of healthy eating behavior by assisting in teaching, learning, and science, they are also cost efficient because knowledge is made available to a vast number of people who are not served by traditional educational systems. Furthermore, it also helps in increase accessibility so that students can access education regardless of time or place. ICT influences the students' learning patterns and how they are taught.

### References

- Albirini, A., 2006. Teachers 'attitudes toward information and communication technologies: The case of Syrian EFL teachers. *Comput. Educ.* 47(4), 373-398.
- Amin, S., NU., 2013. An effective use of ICT for education and learning by drawing on worldwide knowledge, research, and experience. *ICT as a Change Agent for Education. Scholarly Journal of Education*, 2(4), 38-45.
- Bhattacharjee, B., Deb, K., 2016. Role of ICT in 21st century's teacher education. *Int. J. Educ. Inf. Stud.* 6(1), 1-6.
- Bickmore, T. W., Schulman, D., Sidner, C. L., 2011. A reusable framework for health counseling dialogue systems based on behavioral medicine ontology. *J. Biomed. Inform.* 44(2), 183-197.
- Debnath, M., Agrawal, S., 2016. Effect of Nutrition Education and Dietary Modification on the Health Status of Kindergarten Children: A Case-control Study. *J. Nutr. Food Sci.* 6 (6), 101-105.
- Drigas, A., Karyotaki, M., 2013. E-learning and ICTs Applications in Nutrition Science. *International Journal of Recent Contributions from Engineering, Science & IT (iJES)* 1(2), 4-10.
- Ghavifekr, S., Rosdy, W. A. W., 2015. Teaching and learning with technology: Effectiveness of ICT integration in schools. *Int. J. Res. Edu. Sci.* 1(2), 175-191.
- Grabe, M., Grabe, C., 2007. *Integrating technology for meaningful learning* (5th ed.). Boston, MA: Houghton Mifflin. 2(1), 14-20.
- Hall, E. M., 2015. An evaluation and exploration of nutrition education in elementary schools. 5(1), 17-25.
- Hatlevik, O. E., Arnseth, H. C., 2012. ICT, teaching and leadership: How do teachers experience the importance of ICT-supportive school leaders? *Nord. J. Digit. Lit.* 7(01), 55-69.
- Hu, C., Ye, D., Li, Y., Huang, Y., Gao, Y., & Wang, S. 2010. Evaluation of a kindergarten based nutrition education intervention for pre-school children in China. *Public Health Nutri.* 13 (2), 253-260.
- Johnson, A. M., Jacovina, M. E., Russell, D. G., Soto, C. M., 2016. Challenges and solutions when using technologies in the classroom. *ERIC Clearinghouse.* 7(01), 55-69.

- Koch, S., Hägglund, M. 2009. Health informatics and the delivery of care to older people. *Maturitas*. 63(3), 195-199.
- Kupolati, M. D., MacIntyre, U. E., Gericke, G. J., 2018. A theory-based contextual nutrition education manual enhanced nutrition teaching skill. *Front. Public Health*. 6, 157.
- Lewis, K. D., Burton-Freeman, B. M., 2010. The role of innovation and technology in meeting individual nutritional needs. *J. Nutr.* 140(2), 426S-436S.
- Ruzita, A. T., Mab, W. A., & Ismail, M. N., 2007. The effectiveness of nutrition education programme for primary school children. *Malays. J. Nutr.* 45-54.
- Sato, N., Hayashi, F., Yoshiike, N., 2016. Effectiveness of a Nutrition Education Program to Improve Children's Chewing Habits. *International Scholarly Research Notices*. 1-10.
- Tallon, J.M., Saavedra Dias, R., Costa, A.M., Leitao, J.C., Barros, A., Rodrigues, V., Monteiro, M.J., Almeida, A., Narciso, J. and Silva, A.J., 2021. Impact of Technology and SchoolBased Nutrition Education Programs on Nutrition Knowledge and Behavior During Adolescence – A Systematic Review. *Scandinavian J. Educ. Res.* 65:1, 169-180.
- UNESCO, 2002. *Information and Communication Technology in Education-A Curriculum for Schools and Programme for Teacher Development*. Paris: UNESCO.
- Yusuf, M.O. 2005. Information and communication education: Analyzing the Nigerian national policy for information technology. *Int. Edu. J.* 6(3), 316-321.