Developing framework for role of mobile app in promoting aquatic education and conservation awareness among general people

Kamola Saidova[1*]; Manzura Ashurova[2]; Nurbek Asqarov[3]; Sayyora Kamalova[4]; Natalya Radjapova[5]; Feruza Zakirova[6]; Takhmina Mamadalieva[7]; Nargiza Karimova[8]; Kurbonalijon Zokirov[9]

Abstract

Data is gathered for geographical, medicinal, and agricultural research using software tools. These gadgets appeal to scientists because they have a lot of practical hardware attachments (such as a camera, GPS, and accelerometer) and the ability to access and modify software applications (apps). Some teachers are also using tablets into their syllabi for both indoor and outdoor course work in an effort to improve student learning. These gadgets have recently been used by fishery professionals for public outreach and awareness campaigns as well as data collection. Smartphones and digital tablets are becoming increasingly useful for gathering data and educating people about fisheries because to new waterproofing technologies, casings, and accessory adapters. Here, we summarize some of the material that is already available on the use of smartphones and tablets for data collecting and education, and we look at some of the existing and potential applications of these devices in the fishing industry. Our overall goal is to show that fisheries professionals, such as technicians, managers, and educators, may benefit from cell phones and digital tablets.

1*- Tashkent International University of Education, Uzbekistan. Email: t453@tiue.uz,
ORCID: https://orcid.org/0000-0002-0248-3638
2- Fergana Medical Institute of Public Health, Fergana, Uzbekistan.
Email: manzuraashurova1108@gmail.com, ORCID: https://orcid.org/0009-0009-9634-0045
3- Tashkent Medical Academy, Uzbekistan. Email: n.asqarov@gmail.com,
ORCID: https://orcid.org/0009-0003-9639-7427
4- Tashkent State University of Oriental Studies, Uzbekistan. Email: sayera_kamalova@tsuos.uz,
ORCID: https://orcid.org/0009-0009-9085-4934
5- Termez state university, Uzbekistan. Email: nnradjapova@gmail.com,
ORCID: https://orcid.org/0000-0003-1336-8616
6- Tashkent University of Information Technologies, Tashkent, Uzbekistan.
Email: zakirovaferuza2013@gmail.com, ORCID: https://orcid.org/0000-0002-4436-2148
7- Tashkent State Transport University, Tashkent, Uzbekistan. Email: mishel.96@bk.ru,
ORCID: https://orcid.org/0000-0003-1471-6889
8- Jizzakh State Pedagogical University, Uzbekistan. Email: nargiz_82_88@mail.ru,
ORCID: https://orcid.org/0000-0002-1276-963X
9- Tashkent State Agrarian University, Uzbekistan. Email: k_zokirov@tdau.uz,
ORCID: https://orcid.org/0000-0002-8156-5913
*Corresponding author

Introduction

The public's ability to participate in scientific research has been totally transformed by citizen science and mobile applications. The use of mobile devices in our daily lives is growing in popularity. New apps that simplify our lives are constantly being released, and every new iteration of these gadgets adds cutting-edge capabilities that increase their affordability and convenience. These developments have led academics and educators to use these tools to enhance instruction. Applications, which are available for download from the Play store, are the main and most important reason why smartphones are targeted. These smartphone apps benefit fisheries and aquaculture. By employing a smartphone application, fishermen will be prepared to provide a more enjoyable fishing experience, and by promptly identifying fish health issues, significant financial gains could be made from cultivation. Higher cognitive processes for creating and managing land usage and alternative natural resources might benefit from the victimization of modern technologies in agriculture and fisheries. Of the 124 mobile applications in the domains of biology, marketing, marine fisheries and fisheries governance, aquaculture, aquarium management, and fishing, 22.58 percent were of Indian origin. It is anticipated that the market for precision agricultural tool software will expand, and fishing organizations must work with IT companies to develop innovative solutions that are profitable and sustainable. One of agriculture's fastest-growing subsectors is aquaculture and fishing. It is crucial to ensuring the expanding population's food and nutritional security. The industry contributes significantly to the production and prosperity of food worldwide. These days, everyone needs a cell phone in their daily lives. Using mobile applications has become crucial in a number of sectors. Originally created to help with productivity tasks like email, calendaring, and phone databases, smartphone apps quickly expanded into other areas due to public demand, counting portable games, work mechanization, GPS and area based administrations, request following, and ticket costs. Because of public interest, numerous applications in different areas are made. Applications are regularly downloaded from application transport arranges that are worked by the owner of the versatile operating system, for instance, the Application Store (iOS) or Google Play Store (Jabborova *et al.,* 2024). The capability of versatile applications in raising public consciousness of amphibian training and protection is shrouded in this article. The cost of data and correspondence has dropped emphatically because of cell phones. The cell phone has introduced another age for programming designers around the world, incorporating more than essentially equipment. Benefits of mobile applications in education shown in Figure 1.
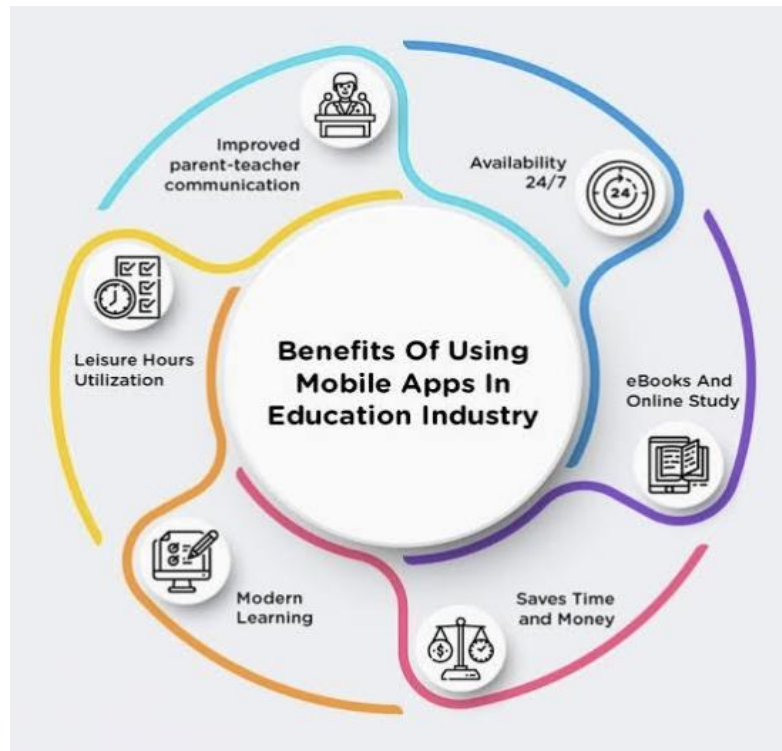
Figure 1: Benefits of mobile applications in education.

Literature Review

Although aquaculture is essential to supplying the world's demand for aquatic food, issues with fish growth and health monitoring have lately arisen in this industry. Recent developments in AI have provided ways to guarantee sustainability and optimize fish farming methods (Turan, 2022). Artificial intelligence (AI) tools such as computer vision and machine learning examine vast amounts of data from fish farms to reveal information on feeding habits, growth trends, and overall health. Smart monitoring systems assess fish behavior and water quality using sensors and data analytics, allowing for prompt actions. AI also minimizes waste and improves feed management, and picture analysis aids in the early diagnosis and focused treatment of diseases. AI integration in aquaculture improves fish wellbeing, increases output, and lessens environmental impact. In order to supply the world's expanding population with animal protein, the fisheries industry is crucial (Boyd, McNevin and Davis, 2022). A major source of nutritional protein and a worldwide delicacy are aquatic creatures. Worldwide hydroponics creation hit record in 2020, which prompted an extensive ascent in oceanic creature creation of more than 60% contrasted with normal levels during the 1990s (FAO, 2018). Aquaculture is a vital industry for providing sustenance, particularly in emerging Asian countries, as capture fisheries are disappearing owing to a number of factors, such as pollution, habitat loss, climate change, and overfishing. In order to increase farm output, aquaculture operations employ a variety of traditional and contemporary technology and equipment at various stages (Welcomme *et al*., 2010; Pauly and Zeller, 2016). Hydroponics has as of late been reformed by a rush of Web of Things

(IoT)- based innovation, for example, shut circuit camcorders for ranch reconnaissance, sensor-based water quality checking, and autonomous feeding devices (Yue and Shen, 2022). Other contemporary culture methods, such as aquaponics, biofloc technology, and recirculating aquaculture systems, have also become more and more well-liked over time (Storey, Van Der Gaag and Burns, 2011). Showing ways to conserve water shown in Figure 2.

Figure 2: Showing ways to conserve water.

Conservation Awareness

With the introduction of new technologies, the IoT and smartphone app sectors are both expanding. The market for smartphone apps is growing and is generating a significant amount of income for the IT sector. Smartphones are more than just a piece of equipment; they have introduced another age for programming engineers all over. Since cell phones give adaptability as far as general setting, versatile learning applications were more effective than conventional preparation methods in further developing end-client information (Vermesan and Friess, 2014). Nonetheless, the quick extension of portable applications has been energized by the advancement of versatile organizations with quicker information rates and further developed admittance, even in distant places, as well as the global decline in the cost of mobile phones. These developments have supported farmers, market integration, extension services, research, and communication gaps. Small stakeholders' agricultural productivity can be increased by addressing the major obstacle of getting farm advisory services through mobile phone-based information routes (Proenza, 2003). Furthermore, mobile applications have enhanced farmers' knowledge levels, decreased information asymmetry, enabled two-way information sharing, and given them personalized advisories. Smartphone apps greatly lower the expense of correspondence and data by assisting with conveying significant data in the right organization and brilliantly. By

utilizing cell phone applications, fish ranchers might make acclimations to their way of life techniques, treat unhealthy fish, and make a deterrent move by observing fish conditions — all without bringing in a specialist to visit the site.

Conclusion

The suggested framework emphasizes how important mobile applications are for raising public awareness of aquatic education and conservation. Aquatic groups and conservationists can effectively engage and educate people about the significance of aquatic ecosystems and the need for conservation by utilizing mobile technologies. The framework lists the essential elements and capabilities that a mobile application should have in order to advance conservation awareness and aquatic education. These consist of multimedia content, games, quizzes, and interactive learning modules that highlight the variety of aquatic life and the effects of human activity on aquatic ecosystems. In order to produce useful and captivating mobile apps, the framework also highlights the significance of cooperation and partnerships between aquatic groups, conservationists, and technology developers. Using this paradigm, conservationists and aquatic organizations can use mobile technology to encourage the preservation of aquatic ecosystems for future generations and to motivate a new generation of aquatic stewards.

References

Boyd, C.E., McNevin, A.A. and Davis, R.P., 2022. The contribution of fisheries and aquaculture to the global protein supply. *Food security*, *14*(3), pp.805-827. https://doi.org/10.1007/s12571-021-01246-9

Jabborova, D., Tanieva, G., Isakov, B., Yaxshiyeva, M., Sulaymanova, N., Tillakhodjaeva, K., Akmalxonov A. and Sattorova, Z. 2024. From Manuscripts to Machines: The Evolution of Book Publishing Devices. *Indian Journal of Information Sources and Services*, *14*(4), 117–124. https://doi.org/10.51983/ijiss-2024.14.4.18

FAO., 2018. World Fishery and Aquaculture Biologiya Morya-Marine Biology.

Pauly, D. and Zeller, D., 2016. Catch reconstructions reveal that global marine fisheries catches are higher than reported and declining. *Nature communications*, *7*(1), pp.10244.

Proenza, F.J., 2003. ICT-enabled networks, public sector performance and the development of information and communication technologies. *Connected for Development-Information Kiosks and Sustainability. New York, United Nations Information and Communication Technologies Task Force.*

Storey, M.V., Van Der Gaag, B. and Burns, B.P., 2011. Advances in on-line drinking water quality monitoring and early warning systems. *Water research*, *45*(2), pp.741-747. https://doi.org/10.1016/j.watres.2010.08.049

Turan, C., 2022. Estimation of CPUE and CPUA of pufferfish (Tetraodontidae) caught by the

Bottom Trawl Fishery in the eastern Mediterranean Coasts. *Natural and Engineering Sciences*, *7*(2), pp.108-119. http://doi.org/10.28978/nesciences.11 59210

Vermesan, O. and Friess, P., 2014. *Internet of things applications-from research and innovation to market deployment,* pp. 364. Taylor & Francis. https://doi.org/ 10.1201/9781003338628

Welcomme, R.L., Cowx, I.G., Coates, D., Béné, C., Funge-Smith, S., Halls, A. and Lorenzen, K., 2010. Inland capture fisheries. *Philosophical transactions of the royal society B: biological sciences*, *365*(1554), pp.2881-2896. https://doi.org/10.1098/rstb.2010.016 8

Yue, K. and Shen, Y., 2022. An overview of disruptive technologies for aquaculture. *Aquaculture and Fisheries*, *7*(2), pp.111-120. https://doi.org/10.1016/j.aaf.2021.04. 009