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Digital equity, sustainable development and the ICT professional

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Abstract. Digital equity and sustainable development are in the focus of attention nowadays. While ICT professionals and professional societies have contributed to supporting developing countries for many years, it is even more urgent nowadays to take responsibility. Technological and also societal developments are happening at an incredible speed with the risk that underprivileged persons and communities are lagging behind faster and further. A risk that is not limited to developing countries but also affects emerging and developed countries. This chapter describes some major UN initiatives and reflects on the options for ICT professionals and professional societies to contribute to achieving digital equity and sustainable development. These options are illustrated by a few examples of what has been done so far. Most of the efforts to contribute meet challenges and impediments and we list a number of them. Finally, suggestions are made to address the challenges and to increase the impact and long term effect of efforts.

Keywords: digital equity, sustainable development, MDG, Millennium Development Goals, SDG, Sustainable Development Goals, WITFOR, developing and emerging countries, ICT4D

1 Introduction

Digital equity and sustainable development are in the focus of attention nowadays. While ICT professionals and professional societies have contributed to supporting developing countries for many years, it is even more urgent nowadays to take responsibility. Technological and also societal developments are happening at an incredible speed with the risk that underprivileged persons, communities and societies are lagging faster and further behind. This is a situation that is not limited to developing countries but also affects persons and communities in emerging and developed countries. The COVID-19 pandemic demonstrates even more the urgency of addressing digital equity. Differences in access to information and to technologies make a difference in chances for continuing education and for saving lives.

IFIP has been active in supporting developing countries for more than 40 years. In these 40 years the world has changed and some major UN initiatives have exerted a

significant impact on efforts to address inequality. This chapter briefly describes these UN initiatives, reflects on some activities undertaken in the recent past and examines the role and involvement of professionals, both on an individual level and as members of societies.

The chapter is written from an IFIP perspective but most of the activities described, problems encountered, and roles and options for the future are also applicable to national and regional societies and associations.

In 2016 an appeal was made that “professionals, scientists and IT professionals and their organization should take a holistic approach for all ICT activities and projects to always include and monitor the effects of their work on the SDGs (Sustainable Development Goals)” [1]. We subscribe to that appeal.

2 Major UN initiatives

As mentioned in the introduction, a number of major United Nations initiatives have exerted a significant impact on efforts to make the world a better place to live in. In this section, three of these initiatives are briefly described.

2.1 Millennium Development Goals (MDG's)

The Millennium Development Goals (MDGs) were eight international development goals established following the Millennium Summit of the United Nations in 2000 with a target achievement date of 2015 [2]. The MDGs are:

1. To eradicate extreme poverty and hunger
2. To achieve universal primary education
3. To promote gender equality and empower women
4. To reduce child mortality
5. To improve maternal health
6. To combat HIV/AIDS, malaria, and other diseases
7. To ensure environmental sustainability
8. To develop a global partnership for development

The Millennium Development Goals have galvanized unprecedented efforts to meet the needs of the world's poorest. [3] The MDGs can be regarded as one of the most important and successful initiatives to eradicate poverty in modern history. The Sustainable Development Goals (SDGs) [1] succeeded the MDGs in 2016.

2.2 World Summit on the Information Society (WSIS)

Following a proposal from the Government of Tunisia, the International Telecommunication Union (ITU) decided to hold a World Summit on the Information Society (WSIS) in two phases. The United Nations General Assembly in 2001 endorsed the holding of this WSIS. The first phase took place in Geneva in December 2003 and the second phase took place in Tunis, in November 2005.

The rationale for this WSIS was the acknowledgment that a global discussion was needed to bridge the digital divide which had increased as a result of fast technological and societal developments. Developing a clear statement of political will and identify concrete steps to achieve an information society for all was the objective of the first phase. The second phase put a plan of action into motion. The ITU website on the WSIS is a rich source of information [4].

After the second summit in 2005, in the context of the annual consideration by the UN Economic and Social Council (ECOSOC) of the integrated and coordinated implementation and follow-up of major UN conferences, the Commission on Science and Technology for Development (CSTD) was assigned to assist the Council as the focal point in the system-wide follow-up of WSIS. Starting in 2006, the annual WSIS Forum organized by ITU and co-organized/supported by almost all UN agencies, addresses progress of the actions and goals defined in the summits and the MDGs and the subsequent SDGs.

IFIP participated in most of the forums, in plenary sessions, with workshops and in preparatory meetings. IFIP has also been an official partner in the forum since 2014.

2.3 Sustainable Development Goals (SDG's)

With the end date of 2015 for achievement of the MDGs and the observation that there was still work to be done to achieve these goals, a new set of goals was defined.



Fig. 1. Sustainable Development Goals. Wikipedia (access 13-08-2020)

These Sustainable Development Goals (SDGs) are a universal call to action to end poverty, protect the planet and improve the lives and prospects of everyone, everywhere. These 17 Goals were adopted by all UN Member States in 2015, as part of the 2030 Agenda for Sustainable Development.

The goals, presented graphically in Fig.1, are: [5]

1. No Poverty – End poverty in all its forms everywhere;
2. Zero Hunger;
3. Good Health and Well-being – Ensure healthy lives and promote well-being for all at all ages;
4. Quality Education;
5. Gender Equality – Achieve gender equality and empower all women and girls;
6. Clean Water and Sanitation – Ensure access to water and sanitation for all;
7. Affordable and Clean Energy – Ensure access to affordable, reliable, sustainable and modern energy;
8. Decent Work and Economic Growth – Promote inclusive and sustainable economic growth, employment and decent work for all;
9. Industry, Innovation, and Infrastructure – Build resilient infrastructure, promote sustainable industrialization and foster innovation;
10. Reducing Inequality – Reduce inequality within and among countries;
11. Sustainable Cities and Communities – Make cities inclusive, safe, resilient and sustainable;
12. Responsible Consumption and Production – Ensure sustainable consumption and production patterns;
13. Climate Action – Take urgent action to combat climate change and its impacts;
14. Life Below Water – Conserve and sustainably use the oceans, seas and marine resources;
15. Life On Land – Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss;
16. Peace, Justice, and Strong Institutions – Promote just, peaceful and inclusive societies;
17. Partnerships for the Goals – Revitalize the global partnership for sustainable development.

The goals are interconnected and all have a strong link to ICT. For each goal it is not difficult to find examples of how ICT can help, or is even instrumental, in achieving the goal. To mention just a few: technology and applications that assist farmers in precision farming and in marketing and distributing agricultural products; health monitoring systems; promotion of healthy living habits using games and IoT; e-learning systems; use of IT to increase efficient use of energy; development of low cost technological products to support industries in developing countries; use of social networks to promote increasing citizen involvement.

Considering constraints in terms of available time and money, individuals and societies have to make choices and set priorities in order to make effective and meaningful contributions to society and mankind.

3 What can ICT professionals and professional societies do

Many stakeholders can contribute to achieving digital equity and sustainable development, and are doing so. Among these stakeholders are governments, industry, academia and non-governmental organizations (NGOs). What are the distinctive features of individual ICT professionals and professional societies that (can) make their contributions different from other stakeholders and in particular from governments and industry? An important distinction is the non-political and non-commercial nature of professional societies. Vested interests and conflicts of interest generally are few. Another important feature is that many members that are active in professional societies live and work in the communities that are supposed to benefit from the SDGs. They are familiar with the on-the-ground realities and thus can advise which initiatives will work (or not) and what adjustments need to be made.

The goal of advancing digital equity, by promoting accessibility of ICT, promoting good practices, and promoting and enhancing appropriate access to knowledge and experiences, can be achieved in a variety of ways.

- **Events.** This category has a broad set of options in itself. It includes events from small (workshops) to very large (conferences, congresses) and events focused on a small set or a broad range of topics. It can be events organized by a professional body on its own or in cooperation with other organizations/stakeholders. It can also be contributions to events organized by others.
- **Research.** Scientific research can be of great support to develop cost effective and pertinent technologies, to adopt emergent technologies successfully, and to help communities draft well-founded policies. Supporting research in developing countries will help focusing on the specific needs and topics for their environment. Also research and comparison of good practices can be helpful.
- **Publications.** Publishing the results of scientific research and of good practices and making these publications easily available enhance knowledge sharing. Encouraging and facilitating contributions from developing countries in book series and journals, promotes researchers and broadens problem solving.
- **Projects.** Specific projects can have a quick impact but also have the potential for a longer term impact.
- **Policies.** Professionals and professional bodies can assist policy makers in drafting policies that include ICT. They can also influence policies by issuing and sharing policy statements and good practices and publish these.
- **Professional bodies.** Supporting the creation and positioning of national and regional professional bodies is a way to get ICT professionals in a better position to effectively contribute to their country/community and to promote ICT use to reach the SDGs.

4 Some examples from IFIP

In a contribution to the Quarter Century of IFIP jubilee book, Narasimhan assessed that the strength of IFIP is its international, non-governmental character [6]. The lack of financial resources is a major limitation to providing assistance and to start essential projects. Despite this limitation significant contributions have been made. This section provides some examples. As stated in the introduction, the chapter is written from an IFIP perspective but most of the examples described are also found in other national, regional and other global societies or associations.

4.1 Committees

The role of “committees” essentially is to initiate, guide and/or coordinate various activities towards the realization / achievement of a specific strategic goal. Committees should create and safeguard conditions that support these activities. IFIP established in 1979, with assistance from UNESCO, the IFIP Committee: Informatics for Development (ICID). ICID’s guiding philosophy was that emphasis should be given to events organized within developing countries. Topics would be selected in direct cooperation with organizations or individuals in those countries, and technical experts would be supplied by IFIP.

In 1987, ICID was transformed into the Developing Countries Support Committee (DCSC). The aim of the DCSC was to promote IFIP’s cooperation with developing countries and to help developing countries/areas in their specific needs and requests. Specific tasks of the DCSC included among others identifying needs and requests from developing countries/areas that may be answered by information and skills available at present in IFIP. Another task concerned interfacing with Technical Committees, Working Groups and Affiliate Members to get involvement and expertise in the different work areas of these groups.

In 2015 another transformation took place. The activities of the DCSC, of the WITFOR Steering Committee and a separate digital equity initiative, were merged into the Digital Equity Committee (DEC). The activities of this Standing Committee are:

- a. Promoting accessibility of ICT;
- b. Promoting good practices;
- c. Promoting and enhancing appropriate access to knowledge and experiences;
- d. Organizing and contributing to activities aimed at achieving the UN Sustainable Development Goals (SDGs) and the goals of the World Summit on the Information Society (WSIS).

Looking at the various subsequent committees and their activities, aims, scope and guiding principles it is interesting to observe that, although using different terminology and despite new types of activities, there is still a strong base from the beginning that has not really changed.

4.2 Working groups

Many of IFIP's technical committees and working groups pay attention to digital equity and sustainable development. In this section we list a few that are dedicated to these topics. Here we provide a brief summary. More information about aims and scopes can be found on the respective websites.

WG 6.9 Communications systems for developing countries [7]

This working group aims to identify and study technical problems related to the access to, understanding of and application of network and telecommunications technology in developing countries or regions. It also encourages cross-fertilization of concepts and techniques among developing countries, and between developing countries and developed countries. The areas of study include models and methods for transfer of concepts and methods in communication systems and the establishment of new applications in developing regions for existing technologies. The requirements of the users of those regions include cost-effective technologies for global access, rural access to services and social development in those regions through appropriate applications of communication systems. The problems of human resources, sharing of experience and cost of technology are particularly acute, and are to be examined in detail.

WG 9.4 – Social Implications of Computers in Developing Countries [8]

This Working Group is currently updating its' aims and scope and has proposed a name change to "The Implications of Information and Digital Technologies for Development". Subject to approval, the aims of the group are:

- To collect, exchange and disseminate the social, cultural, economic, environmental, and political experiences of information and digital technology implementation in all the contexts of the 'Global South' as well as disadvantaged groups in societies more generally.
- To develop greater awareness amongst professionals, policy makers and the public on the social and ethical implications of information and digital technologies.
- To develop criteria, guidelines, methods and theory (including indigenous ones) appropriate to the study of information and digital technologies.
- To establish international collaboration networks of researchers and practitioners interested in the use of information and digital technology for addressing the complex and pressing problems of society.
- To mentor academics and PhD students from across the international collaboration network.
- To promote sustainability and inclusion in all the arenas where we undertake research and practice.
- To enable open access to content wherever possible so as to ensure that all stakeholders can freely benefit from the research that we undertake.

WG9.9 ICT and Sustainable Development [9]

An important aim of this group is to be actively involved in the development of ICT applications which involve the goal of sustainable development. It wants to investigate the interaction among social, environmental and economic issues in the development of ICTs and their applications. A cluster of aims concerns the promotion of worldwide research and practice, the strengthening of interdisciplinary research efforts and the provision of a platform for presenting and discussing emerging ideas and trends in the intersection of the topics ‘information society’ and ‘sustainable development’. Last but not least promoting and supporting the organization of meetings as well as easy access to high-quality data, information and knowledge in this area and related areas are within the scope of this group.

WG 13.8 Interaction design for international development [10]

WG 13.8 supports and develops the research, practice and education capabilities of Human Computer Interaction (HCI) in institutions and organizations based around the world taking into account their diverse local needs and cultural perspectives. It promotes application of interaction design research, practice and education to address the needs, desires and aspirations of people across the developing world. While researching and promoting interaction design practice in cross-cultural settings, with a special focus on new and emerging economies, the group develops links between the HCI community in general and other relevant communities involved in international development and cross-cultured aspects of ICT development.

WG 13.10 Human-centered technology for sustainability [11]

In the field of human-computer interaction, WG 13.10 promotes research, design, development, evaluation, and deployment of human-centered technology to encourage sustainable use of resources in various domains. These technologies would include interaction techniques, interfaces, and visualizations for applications, tools, games, services, and devices. The group brings together, and stimulates exchanges between, researchers, practitioners, and policy-makers from across different disciplines involved in sustainability through regular events. These disciplines would include computer science, engineering, design, social sciences, etc.

4.3 Activities and services**Availability / access to knowledge**

By making the content of scientific event proceedings available for free in its digital library, IFIP contributes to the “access to high quality digital content” element of digital equity. Another way to increase access to knowledge is to promote open access publications. For instance, the Electronic Journal of Information Systems in Developing Countries [12] since its inauguration in 2000 has been online and platinum open access, which means that readers pay no fee for reading and authors pay no fee for submitting and processing articles. [13]

Encouraging and facilitating participation of researchers from developing countries in scientific events is also a good practice for many event organizers, and that creates more access and inclusiveness.

Events - WITFOR

In 2001 a proposal for the organization of a new IFIP flagship event, called the World Information Technology Forum (WITFOR) was accepted. The overall goal of WITFOR is to assist developing countries in developing and implementing sustainable strategies for the application of ICT and to share experiences that will help to bridge the digital divide and improve the quality of life. [3, 14] The specific goals are:

- a. To share and discuss experiences in drafting and implementing ICT policies;
- b. To share and discuss experiences in initiating and implementing ICT projects;
- c. To present and discuss research concerning the overall goal.



Fig. 2. IFIP WITFOR general logo

WITFOR has been organized periodically since 2003 in cooperation with several stakeholders in each host country. The concept of WITFOR is to bring together senior policy-makers, academics, NGOs and GOs representatives, ICT experts, and the private ICT sector with the aim of discussing together ICT policies and practical experiences. WITFOR investigates ICT strategies in developing countries and examines different initiatives and projects on effective, context-sensitive development and use of ICT applications, access to quality relevant information, and the development of “fair use principles”.

IFIP in cooperation with the host countries successfully managed to engage UN bodies and persons in WITFOR with high-level speakers, involvement in the organization and support, for instance, by making conference venues available. Linking WITFOR with a UN event is beneficial for both in terms of availability of speakers and participants, and sharing mutual topics of interest. An example of this is the Second Session of the Conference on Science, Innovation and Information and Communications Technologies of the Economic Commission for Latin America and the Caribbean (ECLAC) which was held as a joint event with WITFOR 2016 in Costa Rica.

Although the term WITFOR is usually linked to the big global conference, the idea is to undertake a number of activities under the umbrella of the World Information Technology Forum (WITFOR). Another idea behind WITFOR was to involve the national professional society of the host country not only in the event but in the network of IFIP relations for the longer term.

Events – Working Groups

The working groups with a focus on developing countries and digital equity have a long track record of conferences. This includes bigger events such as the WG 9.4 bi-annual conferences that are always organized in a developing country location with an average attendance of 150 registered participants. Also smaller events like working conferences as well as special sessions as part of other major conferences are organized regularly by the working groups. The groups strongly encourage the participation of both established researchers and PhD and Master students.

Participation support

With limited general funds IFIP supports the participation of researchers from developing countries in conferences by partially covering expenses. This is a small effort to encourage such researchers to submit papers to scientific conferences and by doing so get involved in international networks of scientists. Besides the general funds, some Technical Committees and Working Groups also provide, whenever possible, sponsorships, often for PhD students in particular, drawing on funds held over from past events.

5 Challenges, impediments

In previous sections we have described how volunteers and volunteer societies can contribute to achieving digital equity and sustainable development goals. A limited number of examples was provided. In many discussions at all levels within IFIP and also outside, concerns are raised about the effectiveness and impact of our efforts. In this section we list some obstacles that volunteers face.

- Volunteers and volunteer societies in general have limited resources, both in terms of time and money. This prohibits for example investments in projects and solid continuous financial support for participation in events from developing countries.
- Working on a voluntary basis makes activities highly dependent on people whose time and commitment may change in time. Moreover, finding good successors is not always possible.
- Good working relationships with governments are dependent on the stability of governments and government policies. Governments change, therefore initiatives supported by one government may suffer from change in support and priorities of the new government.
- Involvement of people from emerging and developing countries, or underprivileged communities in general, can be hindered by lack of funding or lack of access to the information and communication technologies needed for being connected.
- The focus of activities can be too vague or too general which results in not attracting the participants that were envisaged.
- Many scholars, whether from developed or developing countries, are motivated primarily by the prospect of enhancing their curricula vitarum, not by making the world a better place. Thus, changes to scholarly agendas, and reward systems, are essential to the undertaking of research that makes a difference. Thus, the volunteer editors

and reviewers of journals that focus on publishing research that ostensibly makes the world a better place nevertheless have to wade through the treacle of research that is broadly in scope, yet that makes no such contribution.

6 How can we address the challenges

We strongly believe the activities described in the previous sections are valuable contributions to achieving digital equity and sustainable development. In our opinion ICT professionals and professional societies do have an important role to play in these goals. Despite the challenges in terms of financial and human resources, there is still a lot that can be done. The non-exhaustive list of activities in this chapter illustrates that there are many ways to contribute to achieving digital equity. However, in order to increase the impact and long term effect of efforts, it is important to:

- a. set priorities; perhaps based on the experience of what works;
- b. rethink how available funds are spent – and can be raised;
- c. work with local and national bodies to create incentives, rewards and recognition for researchers who set out to make the world a better place via digital equity;
- d. engage groups that are not purely focusing on digital equity but that can contribute due to the nature of their field and work;
- e. increase cooperation with other societies/organizations;
- f. decide what should be achieved with each event or activity and link this planned achievement/target to specific IFIP objectives;
- g. leverage high level contacts and participation in high level events in order to secure funding, recognition, kudos or opportunities that we can leverage; and
- h. change research agendas and research culture, enhance SDG awareness among researchers in order to increase SDG-relevant research and publications. [15]

Furthermore, we can give it another try for initiatives from the past that were not successful (but carefully select initiatives and set priorities):

- a. assist in creating national professional ICT societies in those countries where no such societies exist;
- b. engage these societies in international cooperation, regional and global;
- c. Initiate projects with a longer lifespan as a follow up to an event in a developing country; and
- d. encourage more countries to belong to IFIP, especially those in less developed parts of the world.

In order to encourage volunteers, and in particular academics, to spend time on activities in the digital equity efforts, a way should be found to reward volunteers for contributing to “non-scientific” events with academic credits (comparable to accepted papers in conferences and journals).

COVID-19 has shown that virtual meetings are a solution to inability to travel; one of the obstacles for a bigger involvement of professionals from the developing countries to participate in activities and specifically in events is travel limitations (mostly in terms

of funding). Here we have an opportunity to change at least part of the events that are annually organized to permanent virtual editions or combinations of physical and virtual meetings.

We are convinced that with some adjustments in our approaches ICT professionals and professional societies can make a difference and by doing so demonstrate the added value of such societies.

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