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Increasing women's digital literacy in India: what works

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WOMEN'S EMPOWERMENT COLLECTIVES AND THE POWER OF DIGITAL: A RESEARCH AND LEARNING AGENDA

About the Digital Women's Economic Empowerment project

Women's Empowerment Collectives and the Power of Digital: A Research and Learning Agenda (Digital WEE Project) is a 3-year project that aims to identify how digital technology could enhance pathways to women's empowerment in Women's Empowerment Collectives (WECs). The project is exploring how WECs could effectively harness digital technologies, while mitigating the risk of exacerbating existing inequalities. It is being implemented by BBC Media Action with a grant from the Bill & Melinda Gates Foundation.

About BBC Media Action

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India's digital literacy imperative

As digitisation intensifies in India in response to the Covid-19 pandemic, the digital divide is becoming a profound barrier to social and economic inclusion. Research indicates that there is a stark gender gap in women's access to and use of mobile phones, which is particularly pronounced for rural women.[1] This has proved a chronic challenge to scaling and sustaining digital development solutions for women in India.

While there have been many initiatives to increase women's digital literacy in India, there is no established or documented body of knowledge delineating which approaches have been effective, and what evidence exists for this effectiveness. This report shares the results of a landscaping study conducted to:

- Review digital literacy definitions and frameworks to identify those most relevant to women's empowerment in India.
- Review key initiatives that aimed to improve women's digital literacy in India (and where useful, in other countries), to identify what has worked and what has not, and what gaps in evidence exist.
- Identify implementation approaches and business models that show promise of sustainability at scale.

The gender digital divide in India

The volume and growth of India's digital economy now exceeds that of most other countries.[2] However, despite India's impressive achievements, a digital divide has emerged – i.e., the gap between those who can access the dividends and opportunities of the digital economy, and those who cannot. This gap is particularly acute for women. Estimates of the gender gap in mobile ownership in India vary from 20% to 46%.[3] The more sophisticated the device, the wider the gap; women are much less likely to own a smartphone in India than men, with 37% of men and 14% of women owning smartphones, in contrast to 29% of men and 31% of women owning basic phones in 2019.[4]

Women also tend to use mobiles and the mobile internet differently than men. They use a smaller range of mobile services and use mobile services (other than voice calls) less frequently and

less intensively than men.[5] Sharing and borrowing mobile phones is common, and Indian women are much more likely to be phone borrowers than men.[6] There is also a significant gender gap in internet access and use. In 2020, 42% of adult men as compared to 21% of adult women in India used the internet through a mobile phone.[7]

The gender gap in mobile usage is linked to a gender gap in digital literacy. More women than men report difficulties in using digital technology, and trouble reading content, and more women than men report needing more help from others in using more complex features.[8] Poorly designed handsets, and a lack of relevant content in local languages are also more of a barrier to women than men. In India, gendered inequalities mean that more women than men are illiterate or have lower levels of education, which also constrains their internet use.[9]

What is causing it?

The are many reasons for the gender digital divide in India. These include poverty, higher rates of illiteracy among women, a lack of relevant content, women's low levels of confidence in using technology, safety concerns, and a fear of reputational risk – all of which constrain women's digital access and skill.[10] Although the cost of handsets has not prevented 73% of men in India from owning mobile phones, women still report cost as the single biggest barrier to mobile ownership.[11] For example, in a 2019 GSMA survey of women who do not own phones in India, 34% reported handset cost as the most significant barrier to mobile ownership.[12]

However, even when material barriers to mobile ownership are addressed, this appears to have little effect on women's use of mobile phones, as

evidenced by the Sanchaar Kranti Yojana (SKY) programme in India. In the state of Chhattisgarh, the SKY programme distributed over 2 million free smartphones to the female heads of rural households to try to bring women and their families online. These handsets were paired with a free allowance of one gigabyte of data per month.[13] However, while the program measured a 56% self-reported increase in smartphone ownership among women, women's basic and advanced phone use increased by only 3% and 4% respectively.[14] Although addressing material barriers remains important, the experience of the SKY programme highlights the need to address barriers beyond cost.

Differences in wealth or education alone do not adequately explain the digital gender gap. Among those with higher education in India, analysis of Financial Inclusion Insights survey data from 2015-2016 found that the gender gap in rural areas was almost double that in urban areas, when controlled for other factors.[15] Similarly, analysis of National Family Health Survey data from 2015-2016 found that the digital gender gap in India was wider in rural areas, and wider in some of the wealthier states, such as Andhra Pradesh and Punjab, than in some of the poorer states.[16] Qualitative research to understand demographic variations in the digital gender gap found that these differences may be attributable to the normative environment.[17] For example, respondents in rural areas reported stronger sentiments against women's mobile ownership in contrast to their urban counterparts, while respondents in those wealthier states that had a larger gender gap were more opposed to women owning phones.[18]

Access to (and use of) mobile phones or the internet is often denied to women by 'gatekeepers,' such as in-laws,

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husbands, or other family members, because women are seen as vulnerable to corruption from "bad actors on the internet."[19] This fear of the 'dark' side of the internet is a major barrier to women's mobile internet adoption in India. Even when women do manage to get online, digital engagement comes with its own set of risks, including exposure to bullying, trolling and sexual harassment, as well as fraud and poor data privacy.[20]

While wealth and education are the strongest determinants of digital access and use,[21] it is crucial that implementers designing programmes to increase women's digital literacy in India recognise that the gender digital divide is also rooted in gender inequality and offline gender norms. These normative barriers include:

• Internal normative barriers: related to women's lack of knowledge, negative attitudes, and low self confidence in using digital technology.[22]
• External normative barriers: these exist in women's social networks, such as strong community norms that limit women's access to digital because mobile phone or internet use reflects character and risks their reputations and purity.[23]

Drawing on findings from the literature, we have summarized key internal and external normative barriers to women's digital adoption in India in Tables 1 and 2.

What is digital literacy?

Before effective interventions can be designed to increase digital literacy among women in India, a clear definition of this goal is required. More than 20 digital literacy definitions and frameworks were reviewed for this study. The following common descriptors of digital literacy were identified: digital skills, computer skills, digital citizenship, mobile internet skills, digital competence, digital competencies, and finally, digital literacy. Almost no references to gender were identified. Indeed, only UNESCO and the ITU appear to have considered women's specific digital literacy needs.

Several of the definitions reviewed applied to workforce participation, focusing on the skills-to-jobs pipeline, either through entrepreneurship or the accumulation of workplace skills.

**TABLE 1
INTERNAL NORMATIVE BARRIERS TO WOMEN'S DIGITAL ADOPTION IN INDIA**

Internal barriers	Influence / cause / dependency
Perceived lack of need/relevance	• Lack of knowledge of digital use cases that are both personally appealing and relevant, but also externally justifiable to gatekeepers
Negative perceptions of digital costs	• A perception that the internet is expensive and return on digital investment limited • A lack of knowledge and fear of how to control online expenditure, which stems from a lack of understanding of how much it costs to perform different activities online – i.e. how much data is required to do X, Y and Z
Fear of the 'negative side' of digital (e.g. addiction, harassment, scams, cyberbullying, or damage to relationships)	• Negative attitudes towards the internet (waste of time, disreputable for women, risky etc.) • Coupled with a lack of knowledge of how to stay safe online
Shortage of self-confidence and technical skills	• Low self-confidence in their ability to learn how to use a smartphone • Low self-confidence in how to convince husbands/others to teach them how to use mobile phones or give them sustained access
Lack of time to learn or use digital technology	• Low motivation to make time • Lack of support from family

**TABLE 2
EXTERNAL NORMATIVE BARRIERS TO WOMEN'S DIGITAL ADOPTION IN INDIA**

Internal barriers	Influence / cause / dependency
Perceived lack of need/relevance	• Gatekeepers do not think that there are any useful, justifiable reasons why a woman should use a smartphone
Negative perceptions of digital costs	• Gatekeepers think that it is a waste of money for women to use smartphones and the internet
Fear of the 'negative side' of digital (illicit relationships, infidelity, scams/exploitation, damage to the family's reputations)	• Gatekeepers – particularly husbands – think their wives and daughters cannot be trusted with phones – i.e., they will meet strange men, they will have affairs, they will run off, they will be cheated online, and ultimately, they will damage the families' reputations
Poor use of time	• Gatekeepers think smartphones and the internet are a waste of women's time

These could be more accurately described as 'computer skills' as they focus on competencies such as use of office applications (in the case of Microsoft's digital literacy framework, skills are centred around MS Office), file management, and accessing the internet from a desktop or laptop computer. However, it is most likely that the digitally unconnected in India will first access the internet through a mobile phone rather than a computer. The rural reality of those unconnected and lacking in digital literacy means that

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of working and living in a digital environment" (UNCTAD)

These definitions incorporate a degree of self-autonomy, asking the question 'digital literacy for what?' instead of making that decision for the individual. This focus on self-determination may be more relevant for individuals in rural India, who (for example) might find greater utility in chat applications such as WhatsApp to share information, manage working relationships, promote goods, and communicate with friends and family than in many of the globally dominant online platforms and services. Technologies are inert, and only come alive when they are rooted in the needs of the societies they aim to engage and serve.

this category of digital skills is largely irrelevant – or, at the very least, an ill-conceived entry point.

It is clear from this review that most current definitions of the term 'digital literacy' inadequately capture the suite of competencies required to navigate digital challenges and risk in India, particularly for women. However, considering the context of women in India, the following definitions seem the most relevant:

• "Digital literacy is the ability of individuals and communities to understand and use digital technologies for meaningful actions

within life situations" (Digital Literacy Mission, Government of India)

• "Digital competence involves the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society" (European Commission)

• "Digital competence encompasses the knowledge and skills required for an individual to be able to use ICT to accomplish goals in his or her personal or professional life. Digital competencies should be perceived as not only concerned with technical skills, but more focused on cognitive, social and emotional aspects

Digital literacy initiatives for women in India: promising approaches and weaknesses

Thirteen digital literacy initiatives for low-income women were reviewed for this study: 10 in India, two in Bangladesh, and one in Pakistan and Tanzania. These can be broadly categorized under the following four models (see Table 3).

TABLE 3
FOUR MODELS FOR IMPROVING DIGITAL LITERACY

Model	Description	Digital literacy initiatives reviewed
Internet kiosks, telecentres, and community resource centres	Initiatives that use a physical centre – often a local business such as an internet kiosk or phone sales centre – as a platform for digital outreach and training.	• National Digital Literacy Mission • Telecentre Foundation • The DHAN Foundation • GSMA and Banglalink (Bangladesh)
Community liaison	Initiatives where a community worker goes house to house imparting knowledge about how to use digital technology and providing digital services.	• Internet Saathi • Soochnapreneur • Facebook We Think Digital • iSocial Kallyani (Bangladesh)
Leveraging women's empowerment collectives	Initiatives that leverage women's empowerment collectives to promote digital adoption among members.	• Grameen Foundation: DIVE • Vodafone Smart Snehidi • Nirantar
Digital solutions	Mobile phone-based products or services that train learners specifically on digital literacy and build skills, usually through self-learning.	• Viamo Calling All Women (Tanzania and Pakistan) • KaiOS Life Application (several countries across Africa and Asia, including India)

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Internet kiosks, telecentres, and community resource centres

Promising approaches

Addresses the access barrier

One of the key strengths of this model, evident in all four of the initiatives reviewed, is that physical centres can provide affordable access to digital technology, helping women to overcome the access barrier. If these centres are close to women's homes, they can also provide time savings, enabling women to access digital literacy training and digital services without travelling.

Some initiatives provide women managed and run spaces

However, women need more than affordable access to technology at the village level. They also need gender-inclusive safe spaces where they can build their digital skills over time, transition from basic digital literacy to advanced digital skills, and learn how to use these skills to access public information and governance services.[24] Women often report that they do not feel comfortable in physical centres, due to their (and gatekeepers') concerns about women spending time in male-dominated spaces outside the home.[25]

Several of the initiatives reviewed actively worked to overcome this barrier, by ensuring that learning took place in female-dominated environments. The DHAN Foundation and the Telecentre Foundation, for example, both involved women in the running and management of the centres in India, and training was delivered by local women. Not only did this help families view the centres as safe spaces for women, but these female-run centres were also instrumental in raising awareness in the larger community and encouraging more women to enroll in the training.[26]

Some initiatives encouraged peer group learning

These initiatives also addressed the barrier of self-confidence by encouraging female users to form small groups to create peer learning networks. Peer learning can often encourage women's digital adoption by giving them access to help and support as they learn,[27] and by helping to increase their confidence in using digital technology. The Telecentre Foundation, for example, utilized a peer network model to increase motivation among female learners in India. Online groups or groups connected via text messaging were established to share knowledge and collaborate.[28]

One initiative addressed time constraints

The Banglalink initiative in Bangladesh also catered to women's time constraints by offering training in bite-sized chunks (e.g., 15-minute modules).[29]

Weaknesses

Significant infrastructure issues were a deterrent for users

However, some challenges were identified with this model. Often physical centres – for example, the government community service centres (CSCs) used by the National Digital Literacy Mission in India (NDLM) – had infrastructure issues. These included a lack of connectivity, broken hardware, and intermittent electricity, which all contribute to making regular access difficult and was often a deterrent for users.[30]

Computer-first approach reduced relevance and applicability

In addition, this model often uses technology that women do not have access to at home, focusing on computers and computer-based literacy, rather than mobile literacy. Very few low-income women in rural India have access to computers at home. Therefore, this training is often irrelevant to their daily lives, and women have little opportunity to apply what they have learned.

Some initiatives used male-dominated centres, which constrained female participation

The initiatives reviewed were commendable in their attempts to

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provide access to digital technology and create female-friendly environments. However not all were seen as safe or socially acceptable spaces for women. The government-run CSCs, for example, were seen as male-dominated spaces with few female trainers.[31]

Failed to address fears, or to create a value proposition for women's digital adoption

These initiatives also failed to address other gender-specific barriers to women's digital adoption, such as fear of the negative side of digital, or negative attitudes towards technology, including that it is a waste of time. None of the interventions reviewed appeared to address online safety concerns, none created a clear value proposition for women's use of digital technologies, and few – with the notable exception of Banglalink in Bangladesh – offered a compelling use case for participants themselves, and no clear 'what next' after they attended the digital literacy training.

Community liaison

Promising approaches

Brought technology to women's doorsteps

A key strength of the initiatives that adopted the community liaison model is that they actively worked to address normative barriers including restrictions on women's mobility, a lack of time to travel to physical centres, and gender norms around male-dominated 'unsafe' spaces. They did this by bringing digital technology to women's doorsteps, allowing learning to take place in locations that were socially acceptable for women – i.e., at home or close to home.

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A woman-led, peer-to-peer approach increased confidence

Another key strength of these interventions was that they employed a women-led approach. iSocial Kallyani in Bangladesh and Internet Saathi in India, for example, both used a peer-to-peer teaching method, where local women trained other women in their community, leveraging social networks and trusted female relationships.[32] iSocial Kallyani and Internet Saathi's female trainers acted as visible, relatable female role models who clearly benefited from the use of digital technology by earning an income from the digital services that they provided. Both the peer-to-peer training approach and the visibility of women trainers in the community appear to have helped female learners

overcome the self-confidence barrier, as they were supported by their peers and encouraged to believe that they could use digital technology.

Partnerships provided access to trusted peer networks

Partnerships were also a key strength of the interventions reviewed. Internet Saathi and Facebook's We Think Digital in India both collaborated with a wide network of NGOs, women's federations, and self-help groups, helping them reach more women at the grassroots level by tapping into already established and trusted peer networks.[33]

Flexible, bite-sized, audio-visual learning on mobile phones overcame time and literacy barriers

Another key strength of these initiatives was that they helped women overcome time barriers by offering more flexibility in how and when they learned, and supporting learners at a time and place that suited them. The content was also an asset. Internet Saathi offered audio-visual bite-sized content in local languages to cater to users with lower levels of literacy. Internet Saathi also took a mobile-first approach.[34] Given that rural women are much more likely to have access to mobiles than computers, this approach offered more opportunities for women to practise their learning on their own devices.

Learning took place in locations that were socially acceptable for women

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Weaknesses

However, choice of technology was also a key weakness of these initiatives.

Assumed smartphone ownership among women

Internet Saathi took smartphones and the internet as its starting point. Women needed both a smartphone and a mobile internet connection to be able to receive training from female trainers. This approach automatically excluded most women, who did not own smartphones. It also did not consider barriers to access and use such as affordability of devices and of data, or the poor quality of mobile network and coverage in rural areas.

One intervention took a computer-first approach

iSocial Kallyani appeared to take a computer-first approach (laptops, tablets). Like the internet kiosk model, this meant that women did not have unrestricted, hands-on exploration in their own time and at their own pace. They also did not learn the skills they needed to use the devices they were able to access.

Failed to identify compelling digital use cases for women

While the community liaison model's woman-led approach is clearly instrumental in overcoming some gendered barriers – particularly those related to women's mobility – other barriers prevented female learners from accessing and using smartphones and the internet. These included gatekeepers' fears of the negative aspects of the internet, or beliefs that there were no clear reasons (or justifiable costs) for women to use the internet. While Internet Saathi and iSocial Kallyani in particular provided a compelling digital use case for the female trainers themselves, helping them earn additional income through digital training and services, it was not clear whether female learners (and their families) saw the value of their own digital use.

Leveraging women's empowerment collectives (WECs)

Promising approaches

Focused on compelling digital use cases for women

What stood out from the initiatives

that leveraged women's empowerment collectives in India was the role of compelling use cases, which were often financial. Both the Digital Inclusion via Education (DIVE) and Smart Snehidi initiatives in India structured learning around use cases that were both appealing to women and justifiable to gatekeepers to overcome the relevance barrier.

The DIVE project focused on supporting women to use digital technologies for digital financial services and financial inclusion.[35] While the Smart Snehidi project trained women how to use both devices and the internet for their microenterprises, including how to source suppliers, find customers, and market their products and services.[36] This approach may not only build digital literacy and confidence, but also establish a clear value proposition for women to own and use smartphones and the internet.[37] Smart Snehidi also connected women to an online community where they could sell their products and services and gain access to additional microfinance loans, giving them (and their families) a clear and compelling reason to use digital technologies.[38]

Addressed negative perceptions of cost

Smart Snehidi worked with Vodafone to address the cost barrier[39] around tariffs and data by providing specialised tariffs

and bundles for women, including free talk time valued at INR 50 (less than one US dollar), a free monthly quota of data, subsidised data for pre-installed applications, and 50% off on additional data purchases.[40] These measures made it more affordable for women to use their smartphones regularly and put the skills they learned into practice. Smart Snehidi leveraged women's savings and loans groups to support the purchase of handsets and data, which increases data usage amongst women, therefore creating a business case for Vodafone (their mobile operator partner) to subsidise the cost.[41] This was also observed in the Banglalink intervention in Bangladesh, described under the kiosk model above. However, this approach does require initiatives to have a mobile operator partner who is willing to subsidise tariffs and data plans to make continued use affordable for women, which may not prove scalable or sustainable.

A woman-led, peer-to-peer, network approach built confidence and trust

Like the community liaison model, this women-led approach taps into trusted female relationships, group support and networks. Both DIVE and Nirantar[42] in India used peer teaching that leveraged existing social networks established by WECs. These networks were already accepted and trusted by women, drawing on relatable role models who

had smartphones and used them for appealing, externally justifiable purposes. Smart Snehidi utilised a strong, existing trusted WEC network that was well regarded by women, their families and communities and was therefore likely to encounter less resistance from gatekeepers.

Weaknesses

Some initiatives failed to address the access barrier

While interventions that leverage women's empowerment collectives have many unique strengths, they also tend to suffer from the same issues as the community liaison model. For example, it is not clear how initiatives like DIVE addressed access barriers (such as affordability of devices or data) among the women they trained, or if indeed women in these communities even had access to their own devices to put learning into practice at home. Smart Snehidi went further in addressing this barrier by encouraging women in savings and loans groups to take out loans to buy subsidized handsets, and by providing access to subsidized data.

Did not explicitly address safety and security concerns

Similar to the internet kiosk and community liaison models, there is little information on how these initiatives tackled other normative barriers, such as the perception that the internet is not safe for women. While leveraging a trusted WEC network is one way to assuage women's (and gatekeepers')

Digital literacy initiatives for women need to actively address safety and security concerns

concerns, a digital literacy initiative cannot rely on this trust alone. Digital literacy initiatives for women need to actively address safety and security concerns – both within the training and by engaging with men and boys too.

Digital solutions

Promising approaches

Used accessible technology to engage women without smartphones and to overcome the literacy barrier

Both the initiatives reviewed under this model used appropriate technology to overcome the access barrier. The KaiOS Life App was available on smart feature phones[43] (such as the JioPhone in India), which were less expensive than smartphones. Similarly, Viamo's Calling

All Women project used interactive voice response (IVR) technology to make audio content accessible from any phone, therefore overcoming the literacy barrier, and working to increase women's confidence in using mobile phones for more than person-to-person voice calls.[44]

Specifically addressed the relevance barrier

A perceived lack of relevance is a significant barrier to women's use of the internet in India.[45] The Viamo intervention aimed to change women's perceptions by providing access to audio content explaining the internet, what kinds of phones they need to access it, and safety and privacy issues.[46] The KaiOS Life app had curated content for women on a wide range of topics. In addition to digital literacy content, there

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was content on women's empowerment, financial education, health, education, and agriculture. The aim was to support inexperienced users in learning how to first navigate the internet, and then to gradually build their digital skills while exploring other relevant content.

Designed for those with low digital literacy

The KaiOS Life App was specifically designed for users with low (digital) literacy and had easy-to-follow visual tutorials that showed how to use important tools like Google Maps, WhatsApp, and YouTube. The content was available in both audio and written form, which helped bridge the potential literacy gap. It was also available in local languages. Most of the content was available in English, but certain materials have been translated into languages including: Swahili, Arabic, French, Spanish, Urdu, and several regional African languages.[47]

Provided hands-on self-learning opportunities

Both the Viamo intervention and the KaiOS Life App offered opportunities for hands-on exploration, where users could learn at their own pace on their own devices. The KaiOS Life App was free to use, bundled on the device and worked offline. Therefore, users were not hindered by concerns of using up their data plans. Viamo's Calling All Women offered bite-sized learning opportunities: each audio message was 90 seconds long and in the local language.

Weaknesses

KaiOS Life App was only available on phones with the Kai operating system

The KaiOS Life App is only available on
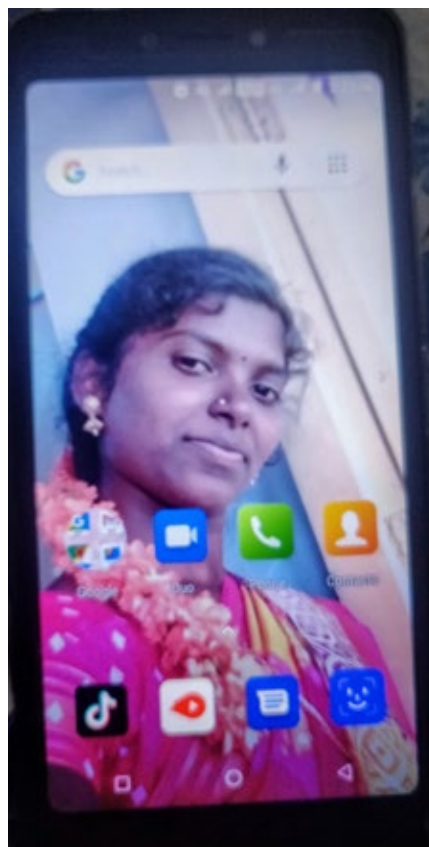
smart feature phones that use the Kai operating system. While women in India are increasingly coming online via smart feature phones, tying the KaiOS Life App to a specific device and operating system presents a significant barrier to women who do not own these phones. Women in India are often the recipients of their husbands' old handsets (when men upgrade they often give their old phones to their wives), which is likely to reduce the speed of adoption.

Fears of the negative side of the internet were not addressed

While both the KaiOS Life App and the Viamo's Calling All Women intervention

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created a clear value proposition for women, neither addressed other external normative barriers such as negative perceptions of women's use of technology or the internet.

Content not in local Indian languages

The KaiOS Life App content is unlikely to engage low literate, low-income women in rural India until it provides content in local languages.

Common blind spots

Although the approaches used to address digital literacy were diverse, the weaknesses of the different initiatives reviewed were surprisingly consistent. Five common blind spots were identified:

1. Most do not address key normative barriers

Most initiatives that aim to increase digital literacy among women do not go far enough in addressing the normative barriers that women face. The majority of interventions failed to specify or expressly state intended gender outcomes, despite their focus on women. Gatekeepers play a key role in the access challenges faced by women. Providing use cases that gatekeepers find compelling and non-threatening is critical to overcoming resistance.

2. Little evidence of effectiveness

There was very little data on the digital literacy outcomes and impact of the interventions that were reviewed, including whether the interventions led to increased digital adoption. When research reports were available, they were largely based on assessments carried out by the implementing organisations. Very few independent evaluations have been conducted. While this self-reporting offers an indication of the success of the project in achieving its goals, an objective third-party evaluation would offer a better assessment of an initiative's successes and failures.

3. Desired outcomes are often unclear

Very few of the initiatives had a standardised definition of digital literacy. While a dozen different definitions were used, they all focused on different stages of the digital user journey and many focused on different devices or

Providing use cases that gatekeepers find compelling and non-threatening is critical

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hardware. Many of the initiatives seemed to lack a grounding in the realities of their environments.

4. No clearly articulated theories of change

The initiatives also typically did not describe a clear theory of change. Some elements of theories of change were occasionally implied – for example, through accounts of the barriers the initiative sought to overcome – others defined aims and objectives. Occasionally reach or coverage indicators were mentioned, which suggested movement towards a specific outcome or impact – but the scope of these outcomes was often unclear.

5. No examples of sustainable business models at scale

Scale has also eluded most of these initiatives. Although some report having reached impressive numbers of people, they have not met their targets. Others seem to face sustainability challenges, seemingly dependent on entrepreneurship models and understandings of scale that are more difficult to realise than anticipated. There is very limited evidence as to whether entrepreneurship / fee-for-learning models are sustainable, and very little public information about business models, costs or the effectiveness of business models is available.

Conclusions

The results of this review clarify that increasing women's digital literacy depends not just on digital skills training, but on increasing their digital access and use. This is not a simple, linear process, and not just a case of distributing devices and data plans to women. There are several conditions that need to be in place, and they need to be in place in tandem. Creating women-led environments and peer networks, for example, are key ingredients of success. But these approaches can only go so far to drive women's digital adoption if the digital literacy training fails to use appropriate technology, or does not overcome women's time constraints. In a way, creating the perfect conditions for success is akin to a jigsaw puzzle: while some parts of the puzzle may be in place, it seems all the puzzle pieces are required to make an effective whole.

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These conditions, or puzzle pieces, include:

- Continuous and regular access to appropriate technology in a safe and secure context near a woman's home
- Learning and support within a female-led environment that leverages groups or peer networks
- Bite-sized content that is delivered in accessible formats (e.g., with audio-visual options) in appropriate languages
- Relevant content that is tailored specifically to women's needs, includes online safety advice, and aims to gain permission from gatekeepers

Another key piece of the puzzle is the need for compelling, externally justifiable, digital use cases that not only appeal to women, but are also approved by gatekeepers. Some of the initiatives that showed the most promise focused on financial inclusion – not just digital banking tools, but technology for a wide range of economic activity. If women are not involved in economic activity already, the barriers to digital literacy may be much higher.

Working with WECs seems a promising approach to increasing the number of women using digital technology and

their digital literacy in India. WECs provide many of the conditions that are needed for success. They already have in place – or can set up – different pieces of the puzzle, including: peer networks, safe women-led environments approved by gatekeepers, and a clear focus on economic activity. However, the organizing principles of a WEC might be key to this – i.e., savings and loans groups that do not also focus on economic activity may not be able to provide sufficiently compelling use cases to stimulate digital adoption among women. However, this hypothesis has yet to be proven. The importance of economic use cases raises questions about what happens to women who are not paid for their work.

Our review showed that economic use cases are a key factor, but data from other countries reveals that there are other appealing digital use cases for women, such as the education of their children and the health of their family, as well as entertainment.[48] Whether these are sufficient to persuade poor families to invest in smartphones and data for women requires further exploration. More work is needed to develop theories of change, further explore and test promising approaches, and evaluate impact.

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Endnotes

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