Lost connection: Reflections on online jewellery design teaching

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Abstract

In this paper, four educators teaching undergraduate jewellery design and manufacture recount our adaptations to online learning during the COVID19 lockdown, and how this impacted our ideas about lecture content and delivery. We look at the possibilities for online study in jewellery design in relation to the developments of the fourth industrial revolution, such as blended learning, simulations and computer-aided design and manufacture. We share adaptations that may serve educators in distance or blended learning scenarios. However, the lockdown created difficult learning circumstances in South Africa in which we often 'lost connection' due to high data costs and inequalities in students' living conditions. We discuss problems of student access, staff and student resilience and wellbeing, and how coloniality and technocracy are bound together in 4IR.

Keywords: 4IR, blended learning, inequality, jewellery design, online teaching, resilience

Introduction

A national lockdown in South Africa began in March 2020 in response to the rise in COVID-19 infections and increasing burdens on the health system. At the University of Johannesburg (UJ), the final week of the first term was cancelled and students went home, 'returning' (virtually) in the second term to the 'new normal' of online teaching. In this paper, four educators teaching undergraduate jewellery design and manufacture recount our experiences and adaptations for online learning to identify what we can learn from this emergency and apply these lessons in future.

The authors Thato Radebe, Khanya Mthethwa and Cailin Ernst are the first, second- and third-year coordinators at UJ's Department of Jewellery Design and Manufacture, while Shashi Cullinan Cook coordinates the Contextual Studies module. The department is headed by Farieda Nazier, who led the process of setting up meetings during lockdown and gathering information to design the curriculum around our students (and offered critique on this paper). Our department is small in comparison with others in our faculty. It employs two permanent staff members, ten contract staff, and has a capacity for 70 students. Student numbers are consistent, with around 23 first-year students, 18 second-year students, 17 third-year students, and eight honours, advanced diploma and master's students. Demographically, student cohorts trained in the department over the last five years have been predominantly people of colour, with equal gender representation.

The experience of online learning alerted us to the potential for the greater integration of technologies of the fourth industrial revolution (4IR) in our teaching. Compared to the other revolutions humankind has experienced, the 4IR is different in scale and complexity. It is described as "the blurring of boundaries between the physical, digital, and biological worlds" and "a fusion of advances in artificial intelligence (AI), robotics, the internet of things (IoT), 3D printing, genetic engineering, quantum computing, and other technologies" (McGinnis, 2020). These advances challenge ideas about what it means to be human and are developing at a rate that affects all aspects of life – economic, industrial, governmental and personal (Schwab, 2016, p. 7). We discuss this and share how online learning shifted our ideas about lecture content and delivery, noting some adaptations that help with blended learning.

However, our paper's title, 'Lost Connection', alludes to the realities of online teaching in which connection was often intermittent and disrupted, and to the social disconnection and opportunities missed due to context-specific issues of inequality and access. This must be considered in relation to the 4IR as it suggests a lingering relationship between coloniality and technocracy.

Methodology and method

This paper is interpretive-constructivist, drawing mainly on reflections by lecturers on their teaching practice, and characterised by "openness to learning and change" and "willingness to revise thinking in light of experience" (Schwartz-Shea & Yanow, 2011, p. 74). Context is essential in interpretive research to "understand how specific human beings in particular times and locales make sense of their worlds" (Schwartz-Shea & Yanow, 2011, pp. 11-12). Interpretive research often begins with abductive thinking. In this case, we noted the lessons of the lockdown and puzzled over their significance for our field.

Throughout lockdown, during online staff meetings and group chats, colleagues shared challenges such as high anxiety, home environments unconducive to work, and the relative usefulness of online teaching platforms such as Blackboard and WhatsApp. As events unfolded, we pondered the significance of this, and the impact of COVID-19, on the future of jewellery design and manufacture education in South Africa. Noting that we had major concerns around the realities of online learning, we delved into this in the form of this reflective research paper – based on our field and working notes, and on "researcher memory, and embodied experience" which are important in interpretive research as these "provide the material for researcher sense-making" (Schwartz-Shea & Yanow, 2011, p. 89). We pooled our reflective accounts and drew from these the themes presented in this paper – concerning the lessons and possibilities of online teaching; staff and student wellbeing and resilience; and coloniality and technocracy. The reflective and retrospective nature of this paper is necessary because the work done during lockdown was not a planned research intervention.

Our conclusions about the practice and implications of online teaching and learning are intended to guide jewellery and design educators in future decision-making.

Innovation under pressure: can jewellery design and manufacture be taught online?

Lockdown showed us that learning online from home presents myriad issues for the ordinary student in South Africa that impacts their wellbeing and performance. However, as educators in a country that embraces technology and intends to keep up with global advances, we must develop and learn more about technologies that work in our context. This begs the question: what are the possibilities for online teaching in jewellery design and manufacture, and what is needed to advance this?

In a paper questioning whether design can be taught online, Katja Fleischmann (2019, p. 3, citing Kumar, et al.) explains that "Comparatively few fully online design courses exist while other academic disciplines are experiencing rapid growth in offering fully online subjects". Fleischmann acknowledges

that while media design lends itself well to exploring fully online design teaching, smaller studio-based classes form the bedrock of learning in many design contexts, focusing on "supporting interaction, active learning" and "social engagement" (Crowther; STP cited in Fleischmann, 2019, p. 1). This is true of our jewellery department as many of the modules are practical – held in studios and workshops.

Jewellery practice, particularly techniques, involves learning manufacturing hand skills and working with precious and semi-precious materials, workshop and bench equipment, tools and chemicals. Hands-on, studio-based teaching is core to teaching 'qualified jewellers', for example, first-year lecturer Thato Radebe literally holds a student's hand to train them to solder.

Metal preparation involves the use of gas and oxygen systems installed and maintained by qualified professionals. This equipment is expensive, specialised, and potentially dangerous (Figure 1). The need for safety and resources makes it impossible for students to work unsupervised outside of the department, and therefore, for lecturers to teach the required techniques. To study these online, students would need a home workshop; constant internet access; and a technician or safety monitor as the substances and processes can be dangerous, and the department could be held legally liable for accidents.

Figure 1. Mmeshi Nkadimeng (photographer), jewellery design and manufacture student working on smelting/metal preparation at the melting bay, 2021

Our challenge during lockdown was to adapt this heavily practical qualification to suit an online learning environment and keep students engaged. Initially we focused on teaching theory, but with no end in sight to the lockdown, the need to awaken practical muscle memory grew pressing. We reintroduced creative practice online using simulations, video demonstrations and time-lapse presentations, YouTube tutorials and model making. Staff and students pushed the limits of their creativity using recycled materials, found objects, and even clay-making skills.

Simulation

To help students keep their manufacturing knowledge on the burner until studios opened, lecturers tasked students with producing videos where they imagined themselves in a workshop environment and recorded themselves doing step-by-step simulations of the manufacturing process. This

encouraged tacit learning because students were using similar motions and thought processes as in a physical studio space. However, students had different levels of access to support materials, and therefore model-making and manufacturing simulations had to be open to interpretation. Morale improved considerably when students were allowed to return to the studio in a partial lockdown schedule, and we rushed to teach and learn as many jewellery techniques as possible in a limited time.

We propose that, in future, design educators could explore using simulations in online learning. If students have access to virtual reality (VR) technology anywhere in the country, it would close the current gap between manufacturing in the real and VR worlds. It is already possible to work on a model with VR, and 3D-print it at home (Atwell, 2017; Nigro, 2020), but the price of such tools is prohibitive. Soon, however, these methods might be normalised and more affordable, and we look toward that possibility, beginning with identifying more accessible computer-aided design and manufacturing (CAD/CAM) programmes.

CAD

The biggest 4IR advancement in jewellery design is in CAD/CAM and 3D printing, or additive manufacturing, which involves using software, hardware, and materials to create physical objects by depositing materials in layers based on a digital model (Autodesk, 2020).

This is advantageous because it allows manufacturing businesses to print their own parts, with less tooling, at a lower cost, faster than via traditional processes, with designs customised to ensure a perfect fit. Designing jewellery using desktop 3D printers (Figures 2-4) combines the precision of CAD with the tactility of a prototype to produce consistent, symmetrical pieces without the tediousness and variability of wax carving (Formlabs, 2021).

Figure 2. Formlabs 2 3D printer, 2019 model (Formlabs 2021)

However, during lockdown, CAD classes were postponed until students could return to the studio because Rhino 7, the software used to teach the module, is licenced to the departmental computers. It costs around R14,000 to buy it for individual use – far beyond what most of our students can afford.

Radebe investigated the use of open-source CAD programmes because the technology is freely downloadable and the plug-ins in most of the programmes are compatible. It is theoretically possible to run an open-source CAD programme called Blender on a smartphone (Coriolis, 2015), but Radebe tested this and found it impractical in the current circumstances. The data needed to download the software was costly, the installation process was complex, and most students' devices lacked the memory to run them. If this were adopted for online learning, a high-spec device would need to become another 'tool of the trade' in addition to manufacturing tools – increasing the overall study costs. Theft is also a factor in a South African context that results in associated costs for insurance and losses.
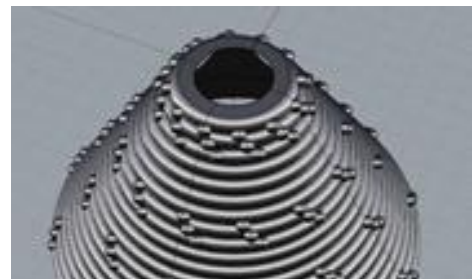

Figure 4. Thato Radebe (designer; photographer), resin ring stand, 2019, photopolymer resin, 2019, 53 x 75mm

We need time and resources, such as suitable applications and hardware, to develop these options. Using Blender to teach CAD online might be viable for distance learning in future, as long as technical support is available to students.

Blended learning in jewellery design and manufacture

Fleischmann (2019, pp. 34) suggests that blended learning is currently a better option for exploration in design education than fully online teaching. In our case, some modules were teachable online on days when students worked from home to avoid crowding in studios. These modules included design and drawing units (supervised drawing and creative tutorials focusing on visualisation); Gemmology (study of the properties of precious stones); Technology 1 (theory behind the jewellery tools and techniques); Contextual Studies (critical thinking and writing about jewellery design history and theory); and Design Management (entrepreneurial skills and business practice). These are our provisional findings, drawn from our reflections on teaching these modules online:

Educational platforms and tools

1. <u>We used mainly WhatsApp and Blackboard as our teaching platforms.</u> Blackboard recording functions and WhatsApp threads and transcripts made it easy for students to access and repeat a lecture. Third-year coordinator Cailin Ernst found that creating PowerPoint lectures with voiceover and posting these on Blackboard worked well for theoretical subjects, followed by discussion boards and Q&A sessions. Some lecturers also used WhatsApp for this purpose with Blackboard serving more as a repository for learning material and a submission portal. Group chat transcripts from WhatsApp and other platforms can be edited and loaded on Blackboard as class notes, making class discussion an integral part of the learning experience and notes.
2. <u>Lecture methods:</u> students looked at lecture content on <u>PowerPoint slides</u> and responded with questions in a flipped-classroom style, or lecture content was created dialogically (through the sharing of texts, voice notes, images and videos).
3. In cases where students struggled to understand the required visual end-products, lecturers tasked them with sketches and gave feedback on problematic areas, providing <u>Googled images</u> as visual references.
4. <u>Video demonstrations and YouTube tutorials</u> are powerful aids in sharing practical tips, and students could watch them repeatedly.

Communication, lecture content and delivery style

Lessons ran as if we were physically in class, greeting students at the beginning of the day/lecture, and noting replies on the register. Not replying equated to not participating, although replies could be asynchronous when real-time communication was impossible.

1. <u>Lecture content had to be self-explanatory</u> to maximise opportunities for students to be independent and self-motivated. This strengthened the quality of the learning materials supplied.
2. Lecturers and students had to be concise and conservative in their wording without oversimplifying. The increased use of writing and reading boosted these proficiencies during lockdown and <u>honed professionalism in written communication</u>.

A 'human touch'

1. Spontaneity and a 'human touch' were conveyed on WhatsApp through <u>voice notes</u> – a low mb/cost option – and by <u>emojis, GIFs and memes</u>. Emojis are integral in online learning, digitally conveying facial expressions and body language.

2. Video and voice notes with enthusiastic tones work best (Brame in Fleischmann 2019, pp. 5), with the voice being a way to connect and convey warmth and interest. Voice notes also help when too much text gets overwhelming or confusing.
3. Online practice and simulating 'real time' effects in online teaching: During timetabled contact time, Radebe explained, "I wanted to ensure that I could give feedback on the work presented as seamlessly as I would have if we were in the design room, from a physical time point of view. … I always had to have my phone in my hand and the ring tone set on loud so that I could jump onto the phone as soon as a WhatsApp message came in". This coheres with findings that "the successful implementation of online collaboration in design depends on high student participation rates and quick instructor feedback" by Bender and Vredevoogd (Fleischmann, 2019, p. 4).
4. Flexibility and spontaneity in online teaching may be reduced if lectures become overly prescribed and transmission-focused, so maintaining dialogical communication creates a responsive learning environment, helping to build trust and ensure affective learning.

Some advantages and lessons of online education:

1. There is an interesting spatial difference in online environments. Physical lecture venues place students 'facing forward' at the lecturer but an online group is more of a web or network of teachers and learners.
2. While there is still a hierarchy and power dynamic in online lectures in which lecturers set topics for discussion, the constant feedback required from students (signalling participation) dilutes the 'sage on the stage' tendencies of some lecturers.
3. While students were slow to formulate and type questions and answers, some seemed more confident to speak up in text than in person. Comments were often more well considered than those voiced in physical classes. More students asked questions than in a physical class situation, and different students posted queries (rather than those who tended to dominate physical lectures). It also seemed that students paid more attention to one another's responses than in physical classes.
4. The 'chatty' quality of WhatsApp communications can be an asset: Online environments in WhatsApp, Zoom or Teams may see multiple conversations coinciding – between lecturers and students, and among students. It does not matter if messages 'interject' in a dialogue. This burble of voices is a vibrant aspect of online communication, provided one can handle distractions.
5. Advantages of online 'studio crits': Studio crits are central to art and design feedback (Fleischmann, 2019). Although intended to be interactive and inclusive, with students and lecturers gathered to give input, there are often practical problems with the physical crit. COVID19 concerns aside, it is difficult for 20 people to gather around a piece and see it equally well. As physical crits wear on, some students become disinvested and hang back, not taking an interest in their peers' work. Lecturers' voices may become dominant, and students may follow lecturers around without offering peers much feedback.

However, greater visibility is afforded when sharing drawings and photographs of progress on WhatsApp groups. Using a messaging component in physical studio crits may spark more (or more audible) peer feedback and encouragement.

These lessons are applicable both in future emergency online teaching scenarios and under usual circumstances, however, some realities of online learning need urgent attention.

Coloniality and technocracy

Conducting our curriculum digitally, while our physical beings were scattered around the country, made us appreciate how the 4IR blurs boundaries between the physical and digital worlds, and we must engage with this in our teaching. However, the issue of lack of student access made the exercise

somewhat unsuccessful even though the possibilities are inspiring, so the difficulties of online learning in a South African context must be addressed. There is a tendency to ignore questions of access in the quest to appear globally competitive. This 'survival of the fittest' narrative perpetuates and entrenches historical inequality.

The writers of this paper all witnessed #feesmustfall – the student-led protests over increases in higher education fees – and we acknowledge high fee costs and financial inequalities between students. Economic contraction is also a generally worrying factor in the jewellery industry (Mamaila, 2020), and we had worked hard before COVID-19 to streamline and improve the course at all levels – technical, business, theory, design, studios and equipment. Having got through the annually challenging hurdle of getting students registered (and perennial funding delays), we were forcibly reminded when students went home during lockdown that their levels of privilege and access differ. Considering these stark inequalities, we took care to keep track of each student, however, this was affected by students' differing access to, and familiarity with, digital resources.

A student registering for an online qualification does so knowing that they require access to a suitable device, stable internet connectivity, and the necessary space, furniture, materials and tools. None of our students signed up for this and many were ill-equipped to participate in this capacity. During early lockdown, it was unnerving to find how many students were completely dependent on the campus Wi-Fi to do online submissions and communicate via electronic media and, initially, there were some students who simply could not attend online, plunging them into the role of being 'digital strangers' – a phrase describing students "without direct access off campus" who may own a mobile/cell phone but do not necessarily have internet or network access, according to Czerniewicz and Brown (Timmis & Muhuro, 2019, pp 3). Many students could not afford the initial increase in mobile data fees (before the free 1GB bundle allocation), and some had extremely poor network coverage – in both rural and urban areas.

Internet access in rural areas is more limited than in metropolitan and urban areas, increasing the difficulties for students applying to and engaging in higher education (Chothia, 2017). Prior to lockdown, Statistics South Africa found that while 61.8% of South African households had at least one member with internet access either at home, work, place of study or internet cafés, only 10% of South African households have internet access at home – and, in the predominantly rural regions of Limpopo, Eastern Cape, and North West – this was less than one per cent (Stats SA, 2018). We were also reminded of the inequalities stemming from South Africa's apartheid history, as it seemed that white students were more likely to have steady access to Wi-Fi at home.

Not all students had devices suitable for sustained online work, due to poor battery life or other faults (for example, some student wrote 1000-word essays on small, cracked smartphones). Theory lecturer Shashi Cullinan Cook initially accepted hand-written submissions, but found that this did not afford students sufficient opportunities to practise using the word-processing tools needed in professional contexts. To level the playing fields, teaching staff applied to the National Student Funding Aid Scheme (NSFAS) for devices for students, and used the support systems UJ provided to assist qualifying students with loan devices. In cases of consistently poor network, students were granted the chance to submit work when their network access improved.

Along with data and network disruption, 'load-shedding' was instituted by South Africa's national electricity provider, Eskom. These scheduled power-cuts (two to four hours a day) impacted how and when students submitted daily tasks. To mitigate this problem, students purchased power banks and charged these and their phones overnight – giving them half a day's battery life to submit daily tasks and maintain participation. This demonstrates the hurdles jumped to approximate 'business as usual', and it does not seem comparable to situations in the 'Global North'.

In his review of Klaus Schwab's book on the fourth industrial revolution, Jake Okechukwu Effoduh (2016, pp. 78) explains that "imagining the possibilities of having billions of people connected by smart

devices, with extraordinary processing power and access to data" is exciting, "not to mention that there are already algorithms used to foretell cultural interests or even software to discover new medications". However, Effoduh (2016, pp. 78) admits to feeling a "sense of despair and pessimism as I became aware of the gap that the 4IR" entrenches between resourced and unresourced contexts in

> *… almost every area of human development and agency. For example, in the West, genetic sequencing is now unbelievably cheap, and humans and machines are augmenting and assisting each other with knowledge and skills. Meanwhile, there are four billion people in the 'Third World' who tend to lack reliable internet access. For Africa, the second industrial revolution is yet to be fully experienced as nearly 1.3 billion people lack access to electricity. The problem rests not with the 'failure' of the 'Third World' to 'catch up' to the 4IR, but it is how the 4IR raises concerns around issues of power asymmetry, security, and the resulting threats of inequality, disempowerment, and exploitation.*

Students' familiarity and comfort with digital resources was also a factor in our context. Researchers from Melbourne, Australia, describe their students as "digitally native – that is, they have been exposed to digital technology from a very young age – and so are expecting their educational institutions to incorporate the latest technologies in their teaching and learning approaches and environments" (Davey, Elliot & Bora, 2019, p. 1). In South Africa, this may be applicable to students who are financially more privileged, but it is not the case for most of our students. In our context, simple, low-data teaching and learning platforms are likely to remain preferable until suitable devices are available to all students, and mobile networks reduce the cost of data.

As institutions of higher education galvanise towards 4IR, issues with network connection, electricity provision, data costs and device availability must be addressed. We need to be clear about what will be available to students going forward, and what we need, if we are to integrate online innovation with real-world realities. Policy makers in all industries must recognise that 4IR compatibility in Africa will promote entrepreneurial experimentation within an appropriate entrepreneurial ecosystem (Naude, 2017, p. 2).

The problem with lauding student 'resilience'

Living in residence helps some students to cope with and escape the harsh realities of their home situations. When students had to leave university residences, many expressed difficulties around their home environments being unconducive to learning, negatively impacting their productivity. Some students experienced overpopulation in their household settings and (sometimes violent) family dynamics that infringed on their focus. In addition, many are the first generation in their family to attend university, which means there may be lower levels of academic support at home. To juggle house chores and course work, some students had to show their parents their timetables and explain what was required of them while working from home. For 'first generation' students, this was an additional stress as they risked being perceived as being uncooperative in their home environment.

Students were remarkable throughout this period, overleaping issues with admirable bravery. Those who missed weeks of lectures showed incredible fortitude in catching up, and we praised their 'resilience'. Resilience is the ability of an individual to overcome, resist, and endure any negative factors they experience within their lived context (Rutter; Walsh cited in Mosavel, et al., 2015, p. 2).

However, Adrian van Breda (2019, p. 10) argues that the definition of resilience for the Global South must consider the long-term effects and life-long traumas of colonisation, poverty and gender-based violence. The 'global South' is "traditionally conceived of as including countries in Africa, Asia and Latin America" but "is not conceived of solely in geographic terms" (SOTL in the South, 2021). The term

encompasses "power differentials, technological and financial resourcing, and the recognition of indigenous knowledges", as well as "income inequality, fractured identities, and contestation about knowledges" in 'postcolonial' contexts (SOTL in the South, 2021). Van Breda (2019) argues that the definition of resilience gives the impression that adversity can be overcome, but in the Global South, there is no end to adversity. This 'resilience narrative' breeds a culture of acceptance of difficulty as a normalised response to an unsupportive environment (Van Breda, 2019, p. 8) – which occurred in our context when marginalised students had to adapt to online learning at home.

Expecting students to accept circumstances, and adapt to changes that do not consider their lived experiences, may manifest as a form of silencing that has negative implications on adolescents' development (Van Breda, 2019, p. 7). In the classroom, lecturers may encounter 'resilient' students who do not vocalise their difficulties because they are so accustomed to trying to overcome adversity. This is true for staff as well, as we teach and complete research in tricky circumstances which are often heavy on administration and understaffed by permanent staff members.

From lecturer to 'reassurer': boundaries and wellbeing

Setting clear boundaries between lecturers and students means respecting one another's family time and wellbeing by avoiding messaging on WhatsApp after office hours or on weekends, but this was upended during lockdown. Staff gave out their personal mobile phone numbers, and worked after hours to accommodate load-shedding and network issues, and students messaged at all hours of the night to save data.

Second-year coordinator Khanya Mthethwa related that students were panicky "about missing out on practicals and could not foresee how they would pass the year without doing what they knew was required for them to pass". Mthethwa's solution to this was "Communication, communication and communication … to assure students that the university was aware of the problem and a resolution would be found" to prepare them adequately for the following year. Mthethwa assured students that she was willing to put in extra and weekend hours to assist them when the time came to return to the studio. This exemplifies how lecturers went above and beyond in responding to the emergency – offering their time with no expectation of increased compensation.

Radebe recounted that he had to change from lecturer-coordinator to 'reassurer', because the first-year students, many of whom are 'first generation', were only just getting settled into a new environment before we shifted online. Later, once boundaries had been reworked, we had to be mindful not to appear tone deaf to students' reasons for not adhering to rules of communication because, with online learning, boundary-setting can become a form of exclusion for some students if not handled carefully.

Conveying a sense of security and stability with students was imperative, but in many cases staff did not really know if things would be 'okay'. In the context of constant changes, lecturers' dedication, optimism and hope stood in for certainty. Treating lockdown education conditions as evidence or motivation for online 'business as usual' is therefore unethical because students and staff had to act like superheroes to achieve passable results.

Conclusion

After researching ways that jewellery design and manufacture might be fully facilitated online, we concluded that the resources and costs required, and the health and safety implications, are presently prohibitive. Our research could be advanced by exploring the use of open-access CAD programmes

and VR-simulated learning and manufacturing, and further exploring the listed benefits of blended learning, such as adding group messaging components to create blended school crits.

However, this should only be instituted if students are aware that they are registering for a partially online qualification, which should only be offered with a sense of how to address digital inequality. Until digital access is available to all students, online and blended learning may be more a case of 'survival of the richest' than of the fittest. To make the most of 4IR innovations without reinforcing inequality and avoid 'lost connections', government and institutional bodies must continue to negotiate ways to mitigate problems such as high data and Wi-Fi costs off campus, varying network coverage, electricity outages, and unsuitable devices and workspaces. In the COVID-19 lockdown, as in other scenarios, lecturers and students stepped into the breach between ideal working circumstances and realities, but student 'resilience' and staff dedication should not consistently bridge systemic gaps. Tackling these inequalities with a united front would help everyone to better manage contextual challenges beyond the COVID-19 lockdowns.

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