The Global Apprenticeship Program (GAP): bridging the gap between talent and opportunities

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Abstract—This innovative practice full paper presents a novel educational program that aims to improve work readiness of emerging talent around the world through remote, paid, global apprenticeships, and human skills training for both apprentices and managers. In the last decade, multiple technical and socioeconomic factors, along with the COVID-19 pandemic, have radically changed the job market, the way companies interact with their employees and customers, and how universities train their students. In response to these changes, we have identified three core aspects of the modern workforce that need attention from academic institutions and industry to promote a more diverse, inclusive, and stable working environment for entry-level and emerging talent, across the world: *1) remote work readiness, 2) real-life mentored learning (apprenticeships), and 3) manager and supervisor preparedness.* Remote work, when properly implemented, has presented advantages and opportunities to students, workers, and companies: it improves performance and facilitates innovation through cross-pollination of ideas between diverse groups and gives opportunities to emerging talent globally. *Internships and apprenticeships* are mechanisms implemented to promote a smoother transition from academia to the workplace. Both internships and apprenticeships promote real-life work experience but differ in that the latter includes a predesigned learning experience guided by a mentor (a seasoned manager). Senior undergraduates are frequently ill-prepared to face the difficulties of work because of a disconnect between their academic training and the needs of a job. This is especially critical in engineering students, who focus mainly on technical skills, leaving behind human and professional skills necessary to thrive in the workplace. Internships and apprenticeships offer opportunities to bridge this gap, though several evaluation criteria must be defined and met to consider them successful. To enhance remote work readiness, as well as success in internship and apprenticeship programs, *manager and supervisor preparedness* is critical for properly guiding engineering students, apprentices, and entry-level employees in their first job experience. With these core concepts in mind and using the Agile Continuous Education (ACE) framework, The Intern Group (TIC) and MIT Open Learning (MIT OL) created the Global Apprenticeship Program (GAP), an initiative focused on bridging the gap between talent and opportunities around the world. The program aims to 1) increase apprenticeship performance and facilitate full-time employment for students and diverse emerging talent, at a global scale; and 2) support how companies successfully recruit, onboard, and retain emerging talent. Innovation in this approach lies in the particular focus placed on the apprentice-mentor (intern-manager) dyad, including tailored training for managers and supervisors. In this paper we present in detail the different programmatic components of the learning tracks. These consist of a variety of individual self-paced asynchronous learning activities, group learning synchronous workshops, community building and cultural exchange events, and a real-life mentored learning experience (apprenticeship). We conclude with implementation challenges, opportunities for improvement, and lessons learned regarding content, pedagogies, and technologies used throughout the program, and effect on participation and engagement.

Keywords—apprenticeships and internships, work readiness, remote work, mentored learning, cross-cultural learning

I. INTRODUCTION

One of the core missions of most Higher Education Institutions (HEI) is to deliver learning and training experiences to the student body so they are prepared to face society's most pressing challenges. This implies improving their local context via political, environmental, cultural, and socioeconomic change [1]. Reaching this mission is possible, in part, when HEI foster the appropriate skills, content knowledge, mindsets and behaviors, but such an approach is not always possible. Rather frequently, there is a disconnect between formal higher education training and the needs of the workforce and the available jobs [2]. Several factors create this disconnect, including a monolithic curricular structure, a lack of articulation between academia and industry, market interests, and the effect of funding on public and private HEI.

Higher education curricula rarely keep up with the pace of technological, economic, and policy innovation [3], partially due to the slow bureaucratic processes required for accreditation and quality control, leading to slow curricular change [4]. Consequently, an outdated curriculum affects proper articulation between HEI and industry, which usually adapts faster to innovations given the pressures coming from the market. Overall, this means HEI are in a Catch-22 situation: training the future workforce with a curriculum from the past.

Moreover, the workforce can sometimes offer employment opportunities that are driven by market forces rather than broader societal needs [5]. Finally, HEI can be influenced by its funding sources, allowing specific interests to dictate what problems academia seeks to solve and hence the profile of the learners trained, deviating HEI's efforts from broader issues that otherwise would drive different training pathways [6,7].

All these factors have been *top-of-mind* for HEI. There is a body of evidence showing that the current educational model, that has been applied for more than a century, needs a revamp to answer to the challenges of the 21st century [6,8].

A. The COVID-19 factor

During the last decade, the higher education community has been exploring ways to improve its current academic, financial, and pedagogical model [6,8,9]. Big strides had been taken using the Science of Learning and educational technologies [10,11,12,13] as the drivers of innovation, but with a mixed reception from learners, faculty, and staff [14,15]. The workforce was also skeptical about the quality of graduates using online training approaches [16,17] while slowly accepting remote work [18,19]. Then COVID-19 came.

The COVID-19 pandemic radically changed how higher education is offered [20,21,22]. It restructured the job market and the workforce and redefined how companies interact with their employees and customers [19]. As a silver lining for the rather unbearable scar the pandemic left in the world, and in some of us, social distancing made evident that remote learning and remote work offer alternatives worth considering, beneficial for all members of society that have access to electricity, a laptop and internet service (conditions not everyone in the world can take for granted) [23,24]. HEI have not always been very successful in preparing its student body for this new reality. Furthermore, the private sector, otherwise flexible to change, was also taken by surprise and is currently grappling with the concepts of hybrid and remote work. In the backdrop of these events, remote learning and remote work connected a more diverse, global community that is currently also seeking ways to adapt to the workforce's new normal.

B. The workforce needs

As the world adapted to the pandemic, academics sought to understand its impact on education and the workforce, and the needs of the public and private sectors. As part of these studies, MIT Open Learning (MIT OL), with the support of The Intern Group (TIG) and the British-American Business Network, surveyed and interviewed a sample of the world's large corporations to understand their current talent needs, and the challenges and opportunities brought by the pandemic regarding recruitment, onboarding, and retention of this talent. Part of the results highlighted opportunities for promoting a more diverse, inclusive, and stable working environment for entry-level and emerging talent, across the world, with managers and supervisors as fundamental players in the retention of this talent [25]. In more detail, the results pointed to three core aspects of the modern workforce that need the attention of both HEI and companies: a) remote work readiness, b) real-life mentored learning (turning internships into apprenticeships), and c) manager and supervisor preparedness.

a) Remote work readiness: When properly implemented, remote work has presented advantages and opportunities to students, workers and companies. Companies can promote diversity and inclusivity, accessing an untapped diverse talent pool across the globe that is better aligned to their clients' needs, time zones and sociocultural background [26]. Workers have found in remote work an unprecedented level of flexibility, agency and autonomy, better work-life balance, and a reduction in commute hours. This new approach can improve performance and facilitates innovation through cross-pollination of ideas between diverse groups and gives opportunities to emerging talent, globally [27]. Nevertheless, remote work also comes with some negative traits. It can lead to a decrease in social interactions, which is known to promote innovation and support the mental wellbeing of workers [28,29]. Moreover, the lack of social contact can break the once common in-person life-long learning experienced by entry-level employees who usually relied on the feedback and mentorship from senior managers and supervisors [30].

b) Real-life mentored learning -turning internships into apprenticeships: Internships and apprenticeships are mechanisms implemented to promote a smoother transition from academia to the workplace. They both promote real-life work experience but differ in that apprenticeships include a carefully scaffolded learning experience, agreed upon by both apprentice and mentor, with the latter usually being an expert in a specific field [31]. Senior undergraduates are frequently ill-prepared to face the difficulties of work as a result of the disconnect between their academic training and the real-life needs of the job market [2]. This is especially critical in engineering students, whose academic training and personal focus lands mainly on technical skills, sometimes leaving behind training in professional skills, necessary to thrive in the workplace, and society. Internships, and specially apprenticeships, offer opportunities to bridge this gap [32,33,34], though a clear oversight regimen must be defined and met to consider them successful [35].

c) Manager and supervisor preparedness: The preparedness and experience of both managers and supervisors is a critical factor for properly guiding engineering students, apprentices, and entry-level employees in their first job, internship or apprenticeship experience [34]. Poor performance from a manager or supervisor often leads to low levels of talent retention [25], increasing pressures not only in the unit that sees the talent flocking away, but in other company departments. High levels of attrition, specially amongst tech companies, are partially related to the preparedness of its managers and supervisors: Some managerial positions are filled by a team member that, after performing impressively in the technical domain, is promoted to lead their unit but without the appropriate training to become a leader [36]. In the context of talent management, a successful manager and supervisor provides proper mentorship, true leadership, and sets up an environment of growth and trust amongst their work unit. Moreover, in the age of remote work, a manager's role should also include encouraging a thriving remote workplace. Due to these needs the *Global Apprenticeship Program* came to life.

II. THE GLOBAL APPRENTICESHIP PROGRAM (GAP)

Employing the Agile Continuous Education (ACE) framework [37], while leveraging on MIT OL's long experience regarding online learning and coaching, and TIG's track in internship procurement, both organizations embarked in the design, implementation, and evaluation of the Global Apprenticeship Program (GAP).

The GAP focuses on bridging the gap between talent and opportunities around the world by enhancing work readiness of entry-level employees and emerging talent via participation in paid remote apprenticeships and professional skills training. The program also includes, in parallel, professional development training to managers and supervisors to better prepare them to lead these entry-level employees and emerging talent. We identify emerging talent as people from historically excluded or underrepresented backgrounds, including refugees, displaced, underserved and conflict-impacted communities. The GAP is offered completely online, in English, under the provision that learners (apprentices and mentors) have access to electricity, a computer, and internet connection.

The program aims to:

- Increase apprenticeship performance and facilitate full-time employment of diverse entry-level and emerging talent.

- Support how companies successfully recruit, onboard, and retain this diverse talent.

The program participants are:

- Apprentices: Emerging talent, seniors or recent college graduates, and young early career professionals from all over the world, participating in remote apprenticeships.

- Mentors: Company managers and supervisors, mentoring these apprentices throughout their remote apprenticeships.

The program provides professional skills training in:

- To apprentices: Social and communication skills; conducting remote work, collaboration, and teamwork; learning agility; proactiveness; leadership; and (multi)cultural awareness.

- To mentors: Inclusive coaching, mentorship and confidence building; diverse, equitable and inclusive workforce management; and remote work leadership.

In 2022, the GAP pilot was run. It was offered free of cost to the apprentices while host companies paid a fee for the talent acquisition (apprentice matching), and the apprentice and mentor training.

The GAP offered two specific innovations: The particular focus placed on the apprentice-mentor (intern-manager) dyad, and the carefully tailored training offered to each one of the learner groups.

A. The GAP learning journey

The GAP was designed based on the ACE model that employs three learning pillars: individual learning, group learning and real-life mentored learning [37]. Therefore, the GAP learning journey consisted of a variety of individual learning via self-paced asynchronous modules, group learning via synchronous facilitated sessions and workshops, synchronous community building and cultural exchange events, online forums and communication platforms, and a remote real-life mentored learning experience (apprenticeship). The individual learning activities were focused on professional skills development, while the group learning synchronous activities included a mix of active, constructive, and interactive experiences that fostered peer-to-peer learning. The apprenticeships entailed interactive, hands-on learning.

Both MIT OL and TIG co-designed and implemented the training activities. Each organization led the delivery of specific activities based on their training expertise (see Fig. 1). Two different learning journeys were designed and implemented, one for apprentices and one for mentors. The content matched the participants' learning needs, using insights from the interviews from the 2021 report [25] and from direct conversations with the Human Resources (HR) departments of the host companies. The learning activities included:

a) TIG asynchronous self-paced activities: TIG offered asynchronous content via their Learning Management System (LMS). Content was divided in 12 different modules (for apprentices), and 4 modules for mentors. The topics offered to apprentices included teamwork, effective communication, problem-solving, CV and resume preparation, interview skills and personal pitch basics, defining internship goals, and working in (multi)culturally diverse spaces. For mentors, the content included managing remote teams, providing feedback, leading an apprenticeship through clear goal setting, and managing a diverse workforce.

b) TIG synchronous workshops and community building events: TIG offered synchronous events every other week that followed two different specific goals: First, inspiring lectures from coaching and remote work experts, that provided insights about the apprenticeship experience, how to speak up, seek manager mentorship, and best practices at the workplace. Second, synchronous social events for peer-to-peer learning, community building and networking. The diverse, global community of apprentices and mentors had their own peer groups where they shared best practices and supported each other. Examples of the community building activities include *Trivia Night* and *Halloween Night*, designed to keep engagement high. Peer-to-peer learning activities were synchronous open spaces for learners to express concerns and challenges in a safe space and get feedback and solutions from their peers.

c) Synchronous kick-off and closing events: Both learners, apprentices and mentors, were invited to kick-off and closing events. The kick-off event included inspirational talks and an introduction of the learning community and the TIG and MIT OL staff. The closing event had the participation of TIG and MIT OL speakers and a showcase of the lessons learned from apprentices, mentors, and TIG (via pre-recorded messages and live presentations).
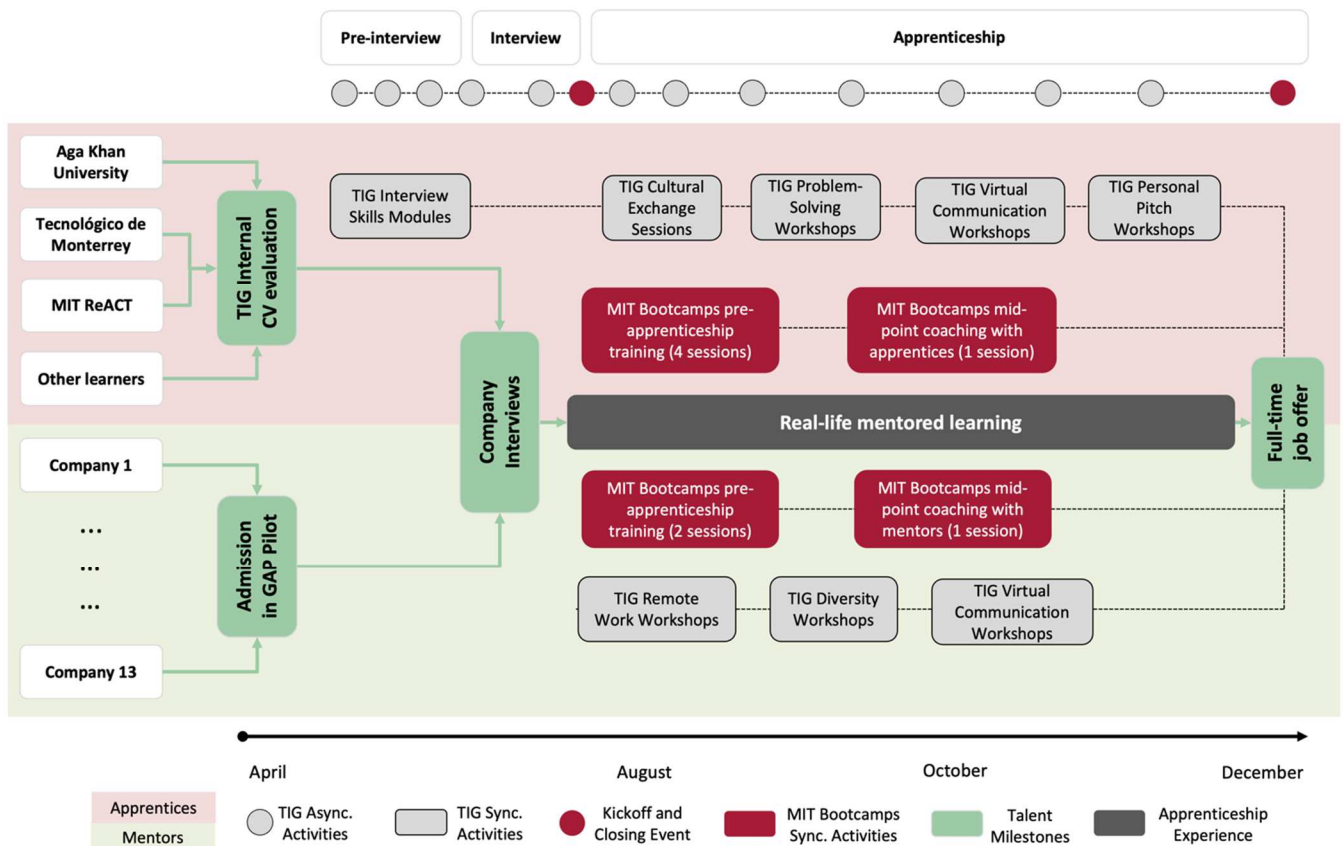
Fig. 1. GAP learning journeys for apprentices (interns) and mentors (managers and supervisors).

d) MIT Bootcamps synchronous facilitated workshops:
[MIT Bootcamps](#) initiative offered two facilitated workshops for each group of learners. One of them occurred prior to the beginning of the apprenticeship and another one halfway during the apprenticeship experience. In more detail:

- *Pre-apprenticeship coaching workshop with apprentices:* Four (4) two-hour facilitated sessions aimed to provide professional skills training in proactiveness, communication, problem solving, conflict resolution, and teamwork in remote environments.

- *Pre-apprenticeship coaching workshop with mentors:* Two (2) two-hour sessions on coaching, leading and managing diverse teams, providing feedback, creating an environment of trust and of continuous learning.

- *Mid-point workshop for apprentices:* This 1.5-hours facilitated session covered burnout and productivity, including strategies and skills to prevent work fatigue, work-life balance, time and self-management, personal satisfaction, productivity, and conflict management.

- *Mid-point coaching with mentors:* A 1.5-hours facilitated session focused on strategies for preventing burnout and keeping the team engaged: including work-life balance, strategies and skills to prevent work fatigue, conflict management and handling misaligned expectations.

e) Paid remote apprenticeship: This is the core learning activity of the GAP. Through remote real-life mentored learning, we aimed to provide an environment for entry-level employees and emergent talent to best apply their technical and professional skills at the workplace, continue building up their resume, gain self-confidence and develop connections with the job market. At the end of the apprenticeship, the program aimed to provide apprentices with the tools to procure a full-time job. TIG oversaw matching both apprentices and mentors based on the companies' hiring needs, the interns' skills and preferences, and other additional information gathered throughout the pre-interview training activities.

f) Learning platform: TIG offered all learners access to the asynchronous self-paced activities via its own learning platform.

g) Community of Peers: A key component of the GAP experience was the interaction of the global learner community via synchronous activities, content forums, and a *Slack* channel. Managers and interns could find in the community of peers a space to share, grow together, and learn from the experiences of their peers.

B. Apprentice profile

As previously mentioned, the program was offered to senior undergraduate students, recent college graduates and young, early career professionals from around the globe; especially from emerging contexts, including Africa, Latin America, and

the Middle East. All learners were expected to have specific technical training to facilitate their match with a host company.

C. Mentor profile

Host companies taking part in the GAP pilot were recruited by TIG. Each company chose the mentor or mentors participating in the program (and hence the units or departments where apprenticeships could take place). Mentors were low to mid-level, or recently promoted, managers and supervisors that the companies' HR departments considered could benefit from leadership and mentorship training.

III. EDUCATIONAL RESEARCH

We implemented a mixed-methods approach to assess the GAP content, pedagogies, and technologies, as well as the impact of both the formal training activities and the apprenticeship experience.

A. Subject participation

All research activities were approved by the MIT IRB office. All participants (apprentices, mentors, and program staff) were invited to participate via email communications. Informed consent was provided to all subjects. A total of 35 apprentices, 22 mentors and 6 program staff members were invited to surveys. A total of 5 staff members were invited to interviews.

B. Research instruments

Two different data gathering approaches were employed: A pre-questionnaire, a check-in (mid-point) questionnaire and a post-questionnaire were shared with all program learners (apprentices and mentors), while a similar pre-questionnaire (prior to the internship) was sent to all program staff. Finally, program staff members were invited to share in more detail issues experienced during the GAP pilot, including mentor participation and engagement. The questionnaires used multiple choice and open-ended questions, and 5-point Likert scales for item rating. The apprentice pre-questionnaires focused on prior technical and professional skills as well as content knowledge, prior work experience, apprentice expectations, and education technology experience and accessibility. The apprentice post-questionnaire assessed the apprentice experience, its challenges and accomplished goals, the apprentice-mentor (intern-manager) and apprentice-host company relationship, as well as an assessment of the asynchronous and synchronous activities. The mentor pre-questionnaire included internship expectations, and the minimum required technical and professional skills and content knowledge from the apprentices. The mentor post-questionnaires included the overall apprenticeship achievements and challenges, the apprentice-mentor and apprentice-host company relationship, and overall program satisfaction. The apprentice and manager check-in questionnaires explored the value of the MIT Bootcamps synchronous activities, its content, and pedagogies. The staff interviews focused on understanding the core program challenges, opportunities for improvement, especially regarding the interaction with and engagement of the mentors, which proved to be challenging across the program.

IV. PROGRAM IMPLEMENTATION

TIG led the GAP programmatic definition and implementation. The key program steps for implementation included apprentice recruitment and selection, mentor recruitment and selection, pre-interview training, synchronous and asynchronous training, interviews and apprentice-host company match, apprenticeship experience, apprentice self-promotion and full-time employment procurement.

A. Apprentice recruitment and selection

TIG recruited most of the apprentices through three different university talent pipelines: Aga Khan University (Kenya campus), Tecnológico de Monterrey (Mexico) and MIT ReACT – Refugee Action Hub (USA and internationally). Another group of learners came from multiple HEI from Colombia, Chile, and Mexico. Each institution's technical expertise was considered to match applicants with the host companies. Aga Khan University provided CVs of alumni, undergrad and graduate students with digital marketing training. Tecnológico de Monterrey shared CVs from finance and economics undergraduate students. Learners from MIT ReACT were participants of the MIT ReACT Computer and Data Science (CDS) certificate, which trains refugees, displaced and emerging talent from all over the world in computer and data science [38]. The other HEI shared a small number of CVs from emerging talent trained in finance. All academic institutions selected their best learners based on academics, attitudes, and commitment to participate in the GAP pilot.

After receiving the CVs and filling out an application form, TIG performed an internal review and interviewed the applicants. Using the companies' roles and skills required as selection criteria, TIG chose the group of applicants that would be part of the GAP pilot. Table 1 presents the number of applications and final selection per institution.

TABLE I.   GAP PILOT PARTICIPATION PER INSTITUTION

Applications to the GAP pilot		
Institution	*Applications*	*Selected (%)*
Aga Khan University	25	11 (44.0%)
Tecnológico de Monterrey	10	1 (10.0%)
MIT ReACT CDS certificate	50	18 (44.0%)
Other Higher Ed. Institutions	15	5 (33.3%)
Total	100	35 (35.0%)

B. Mentor recruitment and selection

As the apprentice application was taking place, TIG recruited in parallel companies interested in participating in the pilot program, hosting apprentices, and including managers (mentors) in the training program. Most of the contacts were developed via the companies' leadership and the HR departments. In several cases there was not a one-to-one apprentice-mentor ratio, some host companies matched more than one intern per manager.

C. Pre-interview training

TIG provided training and preparation to the applicants so they would be ready for the interviews with the pilot host companies. The host companies had the final decision whether to accept or not an applicant as an apprentice. During these training activities, TIG shared asynchronous material through their LMS, and offered synchronous workshops regarding CV

preparation, presentation, and communication skills. Moreover, a big component of the training was also understanding the context and (multi)culture of the host companies so applicants could properly portray their skills and knowledge during the interview.

D. Interviews and apprentice-host company matching

TIG shared a total of 50 CVs to the host companies, which interviewed and selected the applicants based on how well they aligned with the company's culture and needs. Three core areas of technical expertise were used when sharing the CVs: finance and economics, computer and data science, and digital marketing. At this stage the apprentices selection was done by the host companies' HR departments. The apprentice-mentor pairing was done internally, by each company, but TIG provided some feedback to promote the apprentice-mentor dyad was a good match (for more information see section *V. D. Lessons learned and program implementation best practices*). A total of 35 interns were selected.

E. Synchronous and asynchronous training

Implementation of the asynchronous and synchronous activities took place over the six months of the program, with a strong focus on training during the apprenticeship, including both TIG and MIT Bootcamps events. More details on the timing, length and type of the activities can be found in Fig. 1.

F. Apprenticeship experience

During the apprenticeship experience, apprentices and mentors had access to training activities (see section *II. A. The GAP learning journey*). Moreover, TIG sought continuous contact with the apprentices and mentors: weekly communications and emails, and calls (every three weeks with mentors), gauging the apprenticeship challenges and pain points, to adjust the program and to make relevant the upcoming synchronous events, specially the MIT Bootcamps coaching sessions. TIG hosted synchronous feedback sessions for each group of learners (apprentices and mentors) during the apprenticeship. A key component for the apprenticeship was to set attainable goals that would serve the host company mission as well as the apprentice's learning and professional development interests. The next section, *V. Results*, presents a detailed description of the GAP experience and lessons learned regarding program implementation.

G. Apprentice self-promotion and full-time employment procurement

One of the GAP's objectives was to use the apprenticeship as a leverage point for apprentices to secure full-time employment. During the apprentice experience, TIG provided synchronous training (e.g. webinars) in pitch presentation, communication, and networking with the goal of providing apprentices with the tools to present their apprenticeship achievements and motivate the host company to offer full-time employment at the end of their experiential learning experience. Additionally, as TIG staff learned from host companies that they were considering offering specific apprentices a full-time position, or continuing the apprenticeship after the end of the pilot, TIG offered these apprentices one-on-one sessions to increase their full-time employment chances.

V. RESULTS

Program results refer to program and research participation, challenges and opportunities that emerged in the questionnaires and interview responses, and program implementation recommendations.

A. Program participants

A total of 35 apprentices (from 14 different countries) and 22 managers (from 13 different global companies) participated in the GAP pilot. Figure 2 presents the geographic location of the apprentices and the offices of the companies hosting the apprenticeships (location of the mentors).

Engagement and participation in the training activities (outside the apprenticeship experience) was higher from apprentices. Mentors presented lower participation in the asynchronous and synchronous activities. On average, the TIG synchronous activities were attended by 22 (62.9%) apprentices and 4 (18.2%) mentors. A total of 20%, 14.3%, 11.4%, 14.3% and 40% of the apprentices participated in none, 1, 2, 3, or 4 of the four MIT Bootcamps pre-apprenticeship sessions, respectively. From 20 mentors invited to participate in the MIT Bootcamps pre-apprenticeship sessions (at that time 2 mentors were not confirmed by their companies), 65% and 35% attended 1 and 2 sessions, respectively. On average, apprentices and mentors attended 2.4 and 1.35 sessions, respectively. The MIT Bootcamps mid-point workshops were attended by 5 (14.3%) apprentices and 6 (27.3%) mentors.

B. Questionnaire participation

Both groups of learners were invited to the research study and program evaluation. Table 2 presents the total number of survey responses, per questionnaire and learning group. Mentors had a low participation rate, which aligns with their lower engagement in the training activities, as expressed by the program staff during the interviews.

TABLE II.   SUBJECT PARTICIPATION: PRE-, CHECK-IN, POST-QUESTIONNAIRE

Questionnaire participation			
Survey	*Count*	*Participation %*	*Gender % (female-male-other)*
Pre-questionnaire *apprentices*	10	28.6%	50-50-0
Check-in questionnaire *apprentices*	4	11.4%	50-50-0
Post-questionnaire *apprentices*	5	14.3%	40-60-0
Pre-questionnaire *mentors*	4	18.2%	50-50-0
Check-in questionnaire *mentors*	1	4.5%	100-0-0
Post-questionnaire *mentors*	0	0.0%	N/A

Fig. 2. GAP learners geographic location: apprentices (red) and mentors (green). World map adapted from AuthaGraph World Map (from http://www.authagraph.com)

C. Questionnaires and interview results

a) High apprentice engagement and participation: Most of the apprentices were highly engaged and participated in a good number of the asynchronous and synchronous activities. The GAP pilot's cultural diversity seemed to have promoted participation since, for some of these learners, it was their first experience with peers from other regions of the world: they felt motivated to join activities to share with such a diverse community. Community building, acknowledgement of cultural diversity and networking were common in the responses. The GAP pilot was seen by apprentices as an opportunity to gain work experience in international settings, put in practice their technical skills, develop their professional skills, and improve their professional network.

b) Low mentor engagement and participation: Program staff expressed mentors did not engage with the available asynchronous material and had low participation in a good number of the synchronous activities. Mentors had a low response rate to emails and feedback requests from TIG, or from the research team (as reflected by the low rate in questionnaire responses). The reasons for this behavior are multiple, but these include:

- *Different Time zones:* Incompatibility between the scheduled synchronous events and some of the managers' timezone (Fig. 2 reflects the different time zones).

- *We are busy:* Several mentors expressed to the program staff that they did not have the bandwidth to participate in the training activities.

- *Participating in the GAP was not their choice:* Several mentors were informed by the company that they had to participate in the GAP pilot rather than being asked about their interest in participating. It was clear that the companies' leadership and HR departments saw value in the GAP but did not transmit this perception to the mentors.

- *They were not part of the apprentice hiring process:* Some mentors did not participate in the apprentice selection, or apprentices were moved to other units after starting their experience. These circumstances affected the role the mentors could take in the apprenticeship and in the apprentice's learning journey.

Mentors that participated in the synchronous activities were highly engaged. They shared their past managerial experiences with peers and also sought advice from them. In these activities, the discussions were usually facilitated by TIG or MIT Bootcamps. An important aspect to highlight is that mentors suggested shortening the synchronous sessions to 45 minutes so they could accommodate them in their work schedule (some sessions were originally scheduled to last 2 hours).

c) TIG training: Apprentices highly praised the TIG synchronous presentations and community events (specially the motivational talks). Apprentices valued the continuous follow-up and responsiveness from the TIG team, and their support during professional and personal challenges.

d) MIT Bootcamps training: The midpoint session on burnout, work-life balance and conflict resolution was well received by apprentices and mentors. These topics were defined after consulting with the mentors group. In future offerings, it is necessary to include more material regarding managing a team, coaching and facilitating their activities, as well as providing feedback.

e) Impact on employability: At the end of the GAP pilot, a total of 7 (20.0%) apprentices were offered an apprenticeship extension of 4 months. One (2.9%) apprentice got a full-time job offer, but they declined it to pursue a startup idea. Three (8.6%) digital marketing apprentices were invited to work as freelancers.

f) Professional skills training: From the questionnaires and interview responses, apprentices and staff highlighted the guidance on CV and resume preparation, interview skills, communication and pitch presentation training, which provided apprentices tools to better interact with peers, workmates and

mentors. Organizational skills and time management were also mentioned by learners.

g) Technical skills: The apprentices' technical skills expertise was assessed by the universities that provided their CVs. TIG staff pointed out there was a heterogeneous technical skill-level that needed to be taken into account for the apprentice-company match. For this reason, future work will aim at running technical skills assessments during the apprentice selection process.

h) Role of the mentors: TIG staff reported that the mentors of apprentices in the digital marketing, finance and economy fields tended to be more supportive of the apprentices' learning experience, had more attuned expectations from the apprenticeship, and understood the apprences' current level of experience. In comparison, mentors for computer and data science had higher expectations and were not so attuned to the mentorship model.

i) The value of real-life work experience: Apprentices and MIT ReACT staff highlighted the value of the apprenticeship as a step to gain professional experience. MIT ReACT staff also mentioned the importance of having a partner coordinating the procurement of the apprenticeships, one of the pillars of their program (18 apprentices –51.4% of the total GAP pilot participation– were MIT ReACT learners or alumni).

D. Lessons learned and program implementation best practices

a) Needs assessment: It is necessary to facilitate a series of pre-GAP events to listen to both apprentices and mentors expectations and training needs. A tailored content that matches the learners' needs (especially for mentors) is fundamental to keep them engaged. Moreover, it gives mentors some level of agency over the program.

b) Apprentices skills assessment: It is recommended to assess the candidates and apprentices technical and human skills (specially technical skills) to secure a better apprentice-mentor/host company match.

c) Clear expectations regarding the apprentice qualifications: Using results from the apprentices skills assessment, the program staff should share clear expectations with the host companies and mentors regarding the learners' qualification and possible mentoring needs.

d) Mentors more involved in the apprentice selection: During the interview process, companies (leadership and HR units) are recommended to get managers and supervisors more involved in the apprentices selection, so there is a better apprentice-mentor match. This motivates the mentors to be part of the program.

e) Apprenticeship coaching: The MIT Bootcamps synchronous workshops could be more effective if these are offered during the apprenticeship, when both apprentices and mentors are experiencing challenges: It is at this stage that the guidance and facilitation is most needed.

f) Learning from the community: Fostering a community of peers across apprentices and mentors is fundamental. In these spaces mentors and apprentices can share with their peers their challenges and own solutions, improving the results of the apprenticeship. A good facilitator is also key to secure the best outcomes. This is specially useful for new managers, who can tap into the experience of more seasoned managers and supervisors.

g) Short high-impact events: Seek to offer synchronous activities of 45-55 minutes in length over asynchronous ones. This facilitates participation from both apprentices and mentors, especially given the learners' different time zones. Also, if possible, offer different times for the same activity so learners have options that fit their time constraints.

h) Human skills training for apprentices: Offer guidance on CV and resume preparation, training in interview skills, conflict resolution, communication and pitch presentation, as well as organizational skills and time management.

i) Human skills training for mentors: Offer resources to avoid and deal with burnout, and promote work-life balance. Also, offer training on conflict resolution, managing a team in remote and face-to-face settings, coaching and facilitating other's work, as well as providing feedback.

VI. DISCUSSION AND FUTURE WORK

The GAP model is transferable to higher education institutions and companies of any size and type. With this approach, students and alumni are connected to global employment opportunities while companies have access to a culturally and technically diverse talent pool. Companies can systematically seek diverse talent from around the globe, including the developing world. This is a talent that, for the first time in human history, is readily accessible at scale due to remote work opportunities. The Global Apprenticeship Program (GAP) offers access to this diverse untapped talent pool and provides tools for managers and supervisors to properly lead them.

The current results are for the program pilot and the GAP team is currently developing the second phase of the program to include new content and a different timeline that responds to the research findings and learner recommendations.

REFERENCES

[1] J. Ma, M. Pender, and M. Welch. "Education Pays 2016: The benefits of higher education for individuals and society," Trends in Higher Education Series. College Board. https://files.eric.ed.gov/fulltext/ED572548.pdf

[2] K. Jackson, C. L. Lower, W. J. Rudman. "The Crossroads Between workforce and education," Perspect Health Inf Manag, vol. 1 (13), PMID: 27134612; PMCID: PMC4832131, April 2016

[3] L. M. Buja. "Medical education today: All that glitters is not gold," BMC Med Educ, vol. 19 (110), 2019. https://doi.org/10.1186/s12909-019-1535-9

[4] A. Sánchez-Bayón, and E. Trincado Aznar. "Spanish Business Schools paradox and the accreditation system expiry: When the success becomes

a risk," Revista Galega de Economía, vol. 30 (2), pp.1-18, 2021. https://doi.org/10.15304/rge.30.2.6926

[5] P. Egana-delSol, M. Bustelo, L. Ripani, N. Soler, and M. Viollaz. "Automation in Latin America: Are women at higher risk of losing their jobs?," Technological Forecasting and Social Change, vol. 175, 121333, 2022. https://doi.org/10.1016/j.techfore.2021.121333.

[6] C. Escrigas. "A higher calling for higher education," Great Transition Initiative. June 2016. http://www.greattransition.org/publication/a-higher-calling-for-higher-education

[7] M. S. Harris. "The soft underbelly of universities as anchor institutions: The disconnect between university and community research priorities," High Educ Policy, vol. 34, pp.603–621, 2021. https://doi.org/10.1057/s41307-019-00156-y

[8] S. Schwartzman. "Higher education and the challenges of the twenty-First century: An introduction," Higher Education in Latin America and the Challenges of the 21st Century, Simon Schwartzman (ed). Springer, 2020 https://doi.org/10.1007/978-3-030-44263-7

[9] D. Henderson, D. Jackson, D. Kaiser, S. P. Kothari, and S. Sarma. "Ideas for designing an affordable New Educational Institution," MIT Jameel World Education Laboratory (J-WEL) report. September 2022. https://openlearning.mit.edu/ideas-designing-affordable-new-educational-institution

[10] M. T. H. Chi. "Active-constructive-interactive: a conceptual framework for differentiating learning activities," Topics in Cognitive Science, vol. 1, pp.73-105, 2009.

[11] M. T. H. Chi, and R. Wylie. "The ICAP framework: Linking cognitive engagement to active learning outcomes," Educational Psychologist, vol. 49, pp.219-243, 2014.

[12] A. Carvalho, S. J. Teixeira, L. Olim, S.d. Campanella,. and T. Costa. "Pedagogical innovation in higher education and active learning methodologies – a case study," Education & Training, vol. 63 (2), pp. 195-213, 2021. https://doi.org/10.1108/ET-05-2020-0141

[13] S. Sarma, and L. Yoquinto. "Grasp: The science transforming how we learn". Anchor. 2021.

[14] L. P. Pate. "Technology implementation: impact on students' perception and mindset," Inter. Journal of Inform. and Learning Tech., vol. 33 (2), pp.91-98, 2016. https://doi.org/10.1108/IJILT-10-2015-0033

[15] G. Cabaleiro-Cerviño, and C. Vera. "The impact of educational technologies in higher education," Gist Education and Learning Research Journal. No. 20, pp.155-169, January - June, 2020.

[16] J. A. Rosendale. "Gauging the value of MOOCs: An examination of American employers' perceptions toward higher education change," Higher Education, Skills and Work-Based Learning, vol. 7 (2), pp.141-154, 2017. https://doi.org/10.1108/HESWBL-09-2016-0065

[17] K. J. Roberto, A. F. Johnson. "Employer perceptions of online versus face-to-face degree programs," Journal of employment counseling, vol. 56 (4), pp.180-189, 2019. https://doi.org/10.1002/joec.12132

[18] M. Clancy. "The case for remote work," Open paper. Iowa State University Digital Repository. 2020. https://dr.lib.iastate.edu/handle/20.500.12876/22621

[19] P. A. Hill, A. D. Ali, L. K. Narine, and D. M. Spielmaker. "A descriptive analysis of remote work adoption in the United States," Journal of Human Sciences and Extension, vol. 10 (3), 2022. DOI: https://doi.org/10.55533/2325-5226.1428

[20] M. A. Khan. "COVID-19's impact on higher education: A rapid review of early reactive literature," Education Sciences vol. 11 (8): 421, 2021, https://doi.org/10.3390/educsci11080421

[21] R. Petronzi., and D. Petronzi. "The Online and Campus (OaC) model as a sustainable blended approach to teaching and learning in higher education: A response to COVID-19," Journal of Pedagogical Research, vol. 4 (4), 2020. http://dx.doi.org/10.33902/JPR.2020064475

[22] G. Marinoni, H. Van't Land, and T. Jensen. "The impact of Covid-19 on higher education around the world," IAU Global Survey Report, 2020. https://www.uniss.it/sites/default/files/news/iau_covid19_and_he_survey_report_final_may_2020.pdf

[23] S. Montenegro, E. Raya, and F. Navaridas. "Teacher's perceptions of the effects of the digital divide in basic education during the Covid-19 (article in Spanish -Percepciones docentes sobre los efectos de la brecha digital en la educación básica durante el Covid -19)," Revista Internacional de Educación para la Justicia Social, vol. 9 (3), pp.317-333, 2020. https://doi.org/10.15366/riejs2020.9.3.017

[24] M. J. Sosa Díaz. "Emergency remote education, family support and the digital divide in the context of the COVID-19 lockdown," Int. J. Environ. Res. Public Health, vol. 18 (15), 7956. Special issue effects of COVID-19, 2021. https://doi.org/10.3390/ijerph18157956

[25] A. Dillow, D. Lloyd, J. Molina Alvarez, A.F. Salazar-Gomez. "The competition for emerging talent is changing. Who will win?," The Intern Group. November, 2021. https://www.ace.mit.edu/publications

[26] I. Somkene, J. Yang, and P. Bigelow. "Building a framework for an inclusive workplace culture: The Diversio diversity and inclusion survey," The International Journal of Information, Diversity, & Inclusion, vol. 6 (3), pp.52-67, 2022. https://www.jstor.org/stable/48700868

[27] G. Jones, B. Chirino Chace, J. Wright. "Cultural diversity drives innovation: modeling in the global pharmaceutical industry," International Journal of Innovation Science, vol. 13 (2), 2021.

[28] C. Guidarini, and O. Hussaein. "A systematic review of how remote work affects workplace stress and mental health,". In: V. G. Duffy, M. Ziefle, PL. P. Rau, and M. M. Tseng (eds), Human-Automation Interaction. Automation, Collaboration, & E-Services, vol. 12. Springer, 2023. https://doi.org/10.1007/978-3-031-10788-7_5

[29] D. Sull, C. Sull, and J. Bersin. "Five ways leaders can support remote work," MIT Sloan management review, vol. 61 (4), pp.1-10, 2020.

[30] D. Jeske, and C. Linehan. "Mentoring and skill development in e-internships," Journal of Work-Applied Management, vol. 12 (2), pp.245-258, 2020. DOI 10.1108/JWAM-09-2019-0028

[31] B.-J. Ertelt, A. Frey, M. Hochmuth, J.-J. Ruppert, and S. Seyffer. "Apprenticeships as a unique shaping field for the development of an individual future-oriented 'vocationality'," Sustainability, vol. 13, 2279, 2021. https://doi.org/10.3390/su13042279

[32] E. Urquía-Grande, and R. Pérez Estébanez. "Bridging the gaps between higher education and the business world: Internships in a faculty of economics and business," Education & Training, vol. 63 (3), pp.490-509, 2020. https://doi.org/10.1108/ET-01-2018-0017

[33] E. Taylor-Smith, S. Smith, K. Fabian, T. Berg, D. Meharg, and A. Varey. "Bridging the digital skills gap: Are computing degree apprenticeships the answer?," In Proceedings of the 2019 ACM Conference on Innovation and Technology in Computer Science Education (ITiCSE '19), pp.126-132, 2019. https://doi.org/10.1145/3304221.3319744

[34] I. Baker, and D. Fitzpatrick. "Student experiences in pre-COVID virtual internships: Integration, barriers, motivation challenges, supportive supervisors, and intern growth," American Journal of Distance Education, vol. 36 (2), pp.90-102, 2022. DOI: 10.1080/08923647.2022.2034399

[35] F. Moeinzadeh, S. H. R. Ayati, B. Iraj, M. Mortazavi, and V. Vafamehr. "Designing, implementation, and evaluation of internship comprehensive system for assessment and monitoring," J Educ Health Promot. 2021.

[36] A. R. Innes-Taylor, A. Yamazaki, M. Inoue, N. Matsumura, F. Hirata, and K. Waki. "A preliminary analysis of the competency and skills of Japanese IT engineers in managerial positions," International Journal of Learning and Teaching, pp. 214-218, 2021. http://www.ijlt.org/uploadfile/2021/0810/20210810024333471.pdf

[37] A. Bagiati, A.F. Salazar-Gomez, A. Masic, L. Cook, A. Sastry, G. Westerman, C. Breazeal, V. Kumar, K.D. Kennedy, S. Sarma. "Implementing Agile Continuous Education (ACE) at MIT and Beyond: The MIT Refugee Action Hub (ReACT) Case," Conf. Proc. 50th SEFI Annual Conference, Barcelona Spain, pp. 925-933. 19-22 September 2022. https://www.upc.edu/ice/ca/ebook-sefi-2022-1.pdf/

[38] A.F. Salazar-Gomez, A. Bagiati, G. Walsh, L. Cook, A. Masic. "Employment pathways for emerging talent: Evaluating the certificate in computer and data science (CDS)," Conf. Proc. 51th SEFI Annual Conference, Dublin Ireland,11-14 September, 2023. *In press*