

# Empowering Tomorrow's Leaders

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Transformative education (TrEd) is a novel pedagogical approach developed by the Program Director at the authors' university with the intention of putting students in the spotlight. Informed by educational theory and inspired by the potential found within students, TrEd has blossomed into a multifold initiative on the campus of the American University of Beirut (AUB). Mentoring talks are held frequently, providing knowledgeable figures who offer invaluable advice to those in attendance. *ChemCarnival* is a student-run celebration of science, serving as the crown jewel of TrEd's emphasis on student leadership. Students' academic horizons are broadened as well by TrEd's efforts in medical research programs and annual chemistry lectureships. The community is also engaged by TrEd's presence, as evidenced by student-run STEM competitions as well as entertaining events hosted for younger minds. All these programs run in parallel toward the goal of TrEd: promoting a vision for a new world led by transformative leaders.

The world that TrEd was created to address is one full of turmoil and chaos. Indeed, it is sufficient to state that the third decade of the 21st century has presented the world with unprecedented challenges. Reorientation and adaptability are needed to accommodate for such mercurial times, particularly within systems of teaching. Higher education is an indispensable tool to overcome such adversities, and not just through the manifest function of such institutions. Rather, it is via the latent function of universities that students are imbued with skills of human connection, sustainability, and discovery. These lessons do not come spontaneously, however, but rather through the dedicated efforts of engaged educators worldwide.<sup>1</sup> Appropriate methodologies are needed to engage learners with their lived-in environments, thus providing a natural progression from acquisition to application of knowledge. Students of such an idealized system will gravitate toward positions of leadership with the intention of transforming the lives of others for the better.

It is within this milieu that the TrEd Program Director first began to forge the origins of his personal teaching approach. TrEd was launched at the AUB in February 2011 (Figure 1).<sup>2</sup> One of the pillars of this movement is cultivating one's willingness for and adaptability to change.<sup>3</sup> TrEd aims to provide a curated environment that allows for students to play with the immutable concept of change. In accepting this paradigm shift, the locus of control is placed firmly in the hands of the students. The TrEd team consists of committed students from varied majors across the AUB. Despite the positive force TrEd represents on campus, progress is unfortunately not as straightforward as would be desired.

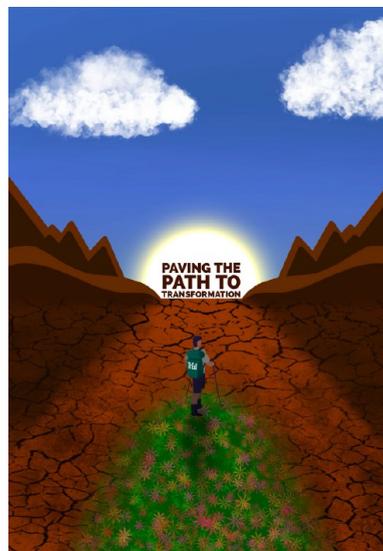


Figure 1. Cartoon illustrating the mission of TrEd. Image created by Ahmad H. Akhdar.

The past few years have created global waves of uncertainty, with Lebanon shouldering a significant burden due to its concomitant economic collapse. The COVID-19 pandemic was further superimposed on top, which led to worsening discrepancies in the quality of education among universities and schools. The Beirut port explosion in 2020 was the proverbial “straw that broke the camel’s back”. The intersectionality of disasters befalling crisis-struck Lebanon was almost too much to bear. Such periods of uncertainty required transformative leadership and innovative solutions,<sup>4</sup> both of which were top priorities in the TrEd initiative.

**Mentoring Talks.** In the aftermath of trauma both in Lebanon and beyond, mentoring and counsel by experienced individuals provide troubled citizens with a role model to seek reassurance from. This principle forms the basis of the *Mentoring Talks* initiative, a core component of TrEd.<sup>5</sup> Since 2016, a total of 28 renowned speakers from different walks of life have been invited by TrEd to provide motivational talks to

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Figure 2. Photos from the 2019 and 2023 AUB ChemCarnivals. Photo credits: photos 1 and 2 by Naji Photographic Center; photos 3, 4, and 5 by J. R. TV Production; photo 6 by Hasan Nisr.

the students of the AUB and elsewhere. Speakers were invited to share key moments from their career paths that defined their trajectory, including both their sweeping victories and their failures. The critical factor of such talks is the presenter's self-awareness that they used to be in the audience's seat at one point as a wayward mentee seeking guidance from on high. This reflects the true power of effective mentoring, which ideally generates mentors from mentees *ad infinitum*. Despite its massive effect on worldwide communication, the pandemic quarantine did not stop efforts in hosting mentoring talks. Several mentoring talks were held via WebEx, targeting an even wider audience across borders.

The lessons gained from guest speakers provide key insights to those in attendance. Students can relate profoundly when esteemed speakers such as Nobel Laureates discuss their failures and, more importantly, how these weaknesses were turned into strengths. Such a talk was delivered by the 2018

Physics Nobel Laureate Donna Strickland, who gave a rousing speech on how she almost abandoned her Ph.D. research project multiple times. This was the self-same research which she eventually published, winning her the Nobel Prize in Physics (only the third woman to win said award).<sup>6</sup> Many other speakers provided similar insights, such as the 1998 Physiology/Medicine Nobel Laureate Louis Ignarro: "You should never let any kind of failure get in your way because life is filled with failures... I tell my graduate and medical students all the time; never give up. Pursue what you believe in. Don't allow any temporary defeat to cloud your mind or interfere with the pursuit of your goals."<sup>7</sup> Following in the same trend, Professor Zhenan Bao gave an endearing mentoring talk regarding her process of enculturation upon moving to the United States.<sup>8</sup> Her background was originally in Mandarin, so the switch to conducting science in English proved to be a unique challenge. Owing to her tenacity, Bao not only



Figure 3. Top: two photos from the 4th International Organic Chemistry Competition (OC4). Bottom left: photo from the first National Medical Competition. Bottom right: photo from the first Residents Medical Competition. Photo credits: Top two photos by Anthony Makhoul; bottom two photos by Naji Photographic Center.

overcame the language barrier but continued to leave an impressive legacy in chemical engineering.

**ChemCarnival.** ChemCarnival (first initiated in 2017) is a special event that sheds light on the enjoyable side of chemistry in a manner which is accessible to non-STEM majors. The targeted audience are younger minds, with the intention of changing the stereotype of chemistry from one of intimidation to one of joy. ChemCarnival is a public event where the AUB opens its doors to people including youth, the elderly, students, parents, professors, and the community at large. Due to the success of the pilot event, ChemCarnival became an annual occurrence on campus until 2019 (owing to the COVID-19 pandemic). ChemCarnival's revival in 2023 brought the popular show back to even greater heights, much to the delight of the AUB community and far beyond (Figure 2).<sup>9</sup>

Students from the TrEd team are the center of attention, performing the experiments themselves in front of a live audience. They develop into seasoned chemists via months of preparation and trials, until they achieve mastery in their performances. The Program Director guides students through the experiments initially, providing them with the tools for independent performance and efficiency. Training for the ChemCarnival fosters these skills by empowering the students with the confidence and leadership necessary to host such a show. Calling on the work of educational theorist David A. Kolb, "learning is the process by which knowledge is created through the transformation of experience."<sup>10</sup> The bellowing cheers at the end of every experiment spoke to the pride, satisfaction, and excitement felt from each success.<sup>11</sup>

**The Medical Research Volunteer Program (MRVP).** Owing to its importance as an integral part of the scientific

method, research is essential to many facets of society generally and education specifically. Unfortunately, it is uncommon for educational institutions to provide access for undergraduate students to participate in medical research. The Medical Research Volunteer Program (MRVP) was launched in May 2014 to bridge this gap between traditional learning and hands-on experiences.<sup>12</sup> Undergraduate students are matched with researchers on the basis of their professional interests. After successfully matching through the portal system, students are immediately provided with the necessary information *vis-à-vis* the project's objectives, timeline, and the Principal Investigator (PI). Before linking the student and researcher, a series of workshops are held by the MRVP governing committee to better prepare the students for such an undertaking.

It is noteworthy that the ongoing financial and economic collapse of Lebanon has resulted in the departure of a considerable number of M.D.s from the AUB Medical Center (AUBMC). This hurdle was a major obstacle for the MRVP, since many undergraduates were unable to get matched with PIs at the AUBMC for a period. This initial setback was used as an opportunity to establish the more ambitious MRVP-International (MRVP-Int'l). MRVP-Int'l was launched in September 2021 as an extension of its parent initiative, linking medical doctors from across the globe to AUB undergraduate students. Those enrolled in MRVP-Int'l perform their share of medical research remotely, forgoing the need for physical meetings. The flexibility afforded by this novel approach has broadened the opportunities available for students and enabled them to co-author publications with PIs from reputable institutions around the world.

**Chemistry Research Lectureship.** The TrEd Program Director established an endowment in 2011 in the name of Professor Makhlof Haddadin, a distinguished chemistry professor at the AUB.<sup>13</sup> The proceeds of the Endowment have been used to fund awards for outstanding chemistry graduates, in addition to funding an annual chemistry lectureship. World-renowned chemists are invited to AUB's campus to deliver stimulating research talks and interact with junior colleagues. The close in-person interaction with the guest(s) of honor serves as a superb networking opportunity, leading to a butterfly effect of mentoring across time. Indeed, some TrEd graduates went on to pursue Ph.D. programs headed by previous guest speakers because of their TrEd-mediated interactions. This initiative continues to provide students with a ticket to cross academic roadblocks and alter the trajectory of their fledgling careers by brushing shoulders with giants.

**Ig Nobel Talks.** On March 4, 2019, a new TrEd initiative was inaugurated: the hosting of Ig Nobel Prize winners. The idea behind the Ig Nobel Prize was established by Dr. Marc Abrahams in 1991, conferred upon 10 individuals annually for their contributions that "make people *laugh*, and then *think*". Coincidentally, this re-enforces current notions in neuroscience which relate neuroplasticity to a mentally stimulating environment in humans as well as other species. In 2019, Professor David Hu gave one such talk at the AUB.<sup>14</sup> Most of the members of his audience were school-age children, despite the content being ostensibly above their level of comprehension. Nevertheless, the lecture itself was designed in a manner for a young audience to understand. These young minds showed great comprehension of the scientific content of the talk, inferred by their select choice of questions. It is important to note that these children not only were learning but were happy while doing so, stimulating their curiosity and drive toward science.

**Organic/Medical/Residents Competitions.** Originally derived as a tool to practice organic chemistry in class, clicker remotes were updated to deliver a new initiative at the AUB, the Organic Chemistry Competition (established in 2011).<sup>15</sup> The Organic Chemistry Competition creates an ideal balance of productivity while fostering a playful environment. Students in the TrEd team took the lead in organizing these competitions and prepared creative video clips to commemorate the event.<sup>16,17</sup> Teams of two students compete using clickers that are programmed to take only one response. All students left the competition as winners, with memorable experiences and connections with people of varied nationalities, races, and backgrounds. Using the same model, the TrEd team organized the first National Medical Competition in Lebanon: 58 teams (consisting of two medical students per team) originating from seven medical schools across Lebanon participated.<sup>18</sup> Furthermore, the first Residents Medical Competition was organized, in which medical residents from five hospitals across Lebanon enthusiastically participated (Figure 3).<sup>19</sup>

**Glass Art Show.** The most recent TrEd initiative was the first Glass Art Show, held on May 5, 2023. The master glass blower from the Chemistry Department at AUB showed the magic of shaping glass to hundreds of attendees.<sup>20</sup> Children in attendance were especially moved by this fantastical show of swirling shapes and colors.

**Stepping into the Future.** Student empowerment is witnessed within every aspect of TrEd. This initiative provides

students with a holistic approach to education, opening their eyes to possibilities hitherto unexplored. TrEd has created great headway in transforming the conventional method of instruction via interactive events, experiential learning, hosting renowned speakers, and much more. It is the duty of educators to provide students with a platform to excel with every student spotlighted in a unique way. TrEd takes this duty seriously and allows it to permeate every step along the way. With its explicit commitment to a diverse student body and inclusive principles, TrEd has bloomed into a mosaic of different minds and talents. The kaleidoscopic union of different viewpoints from across campus and beyond forms the nexus of the TrEd initiative. By promoting a culture of progressivity and dynamism, the wellspring of TrEd is self-renewing, never running dry of new ideas or ambitions. Such a model of collaborative teamwork is applicable in educational environments worldwide, as TrEd has specifically been crafted with multifold cultural contexts in mind. Indeed, it is the intention of the TrEd Program Director that similar initiatives be created in higher educational institutions worldwide. Potential collaboration between various Transformative Education movements may provide the building blocks for farther-reaching goals, including future plans for symposia, competitions, research projects, and more. In doing so, a truly transformative approach to education can be fostered on a global level, potentially finding solutions to our 21st-century problems and beyond.

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## Notes

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## ■ DEDICATION

This paper is dedicated to the memory of Professor Makhlof J. Haddadin, who served the American University of Beirut with much distinction for 57 years. Professor Haddadin passed away in his native Jordan on September 21, 2022.

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