Motivation and Objectives. In the industrial age, as Sal Khan explains [1], the society had resemblance to a pyramid, with a large pool of labor lying at its base, and entrepreneurs and the creative class residing at the top. Today, however, automation is taking over the repetitive tasks at the bottom of the pyramid. The aspirational challenge today is to flip the pyramid, so that a sizeable share of the population can contribute as entrepreneurs, artists, or researchers. Therefore, the value of honing soft-skills in humans (e.g., problem-solving, creativity, leadership) is ever on the rise.

The primary focus of my research is to explore how online network technologies can help improve soft-skills, such as public speaking, story-telling and creativity, in humans. For that purpose, I take a two-pronged research approach: (1) Understanding the skills: applying quantitative and qualitative methods to understand and model the intricacies associated with the soft-skills, and (2) Understanding the network-effects: exploring the effects of network dynamics, social elements and interaction design considerations of online peer-collaboration networks that assist in developing the soft-skills.

Speaking-skills Development in Online Collaborative Networks. I led the collection of a dataset of 6 online communities, where the participants (N = 158) focused on improving their speech-delivery skills. They webcam-recorded speeches and exchanged feedback comments and performance ratings with their peers in our system. We mined the data with novel Graph Signal Processing-based analysis and prediction frameworks, and found that the participants’ ratings are affected by their peers’ ratings and the interaction patterns—as participants gradually improve and perform closer to the peers they interact with [2]. Palgrave Communications, Nature Publishing Group’s digital humanities venue, listed this publication in its collection of ‘Quantitative Methodologies: Novel Applications in the Humanities and Social Sciences’.

In a follow-up work, we employed thematic analysis using Grounded Theory on a similarly attained dataset (2 online communities, N = 30 each) to understand, qualitatively, the collaboration factors that influence speaking-skills development [3]. This work, published in ACII’19, complements the aforementioned quantitative insights to explain how the skill development mechanisms take place in conjunction with peer-interactions. The results further shed light on the design implications of such skill-development systems.

Story-telling. Telling a captivating story often involves altering the emotion-contents, as the ups and downs of the plot narrative unveils. We analyzed the transcripts of more than 2000 TED Talks, and extracted their sentence-wise emotion, language and personality scores. We found that these ‘narrative trajectories’ can help in classifying and predicting the audience ratings of the talks. Clustering analysis revealed how various trajectory shapes trigger different audience responses: for example, people find talks with flat ‘joyfulness’ trajectories long-winded, but ones with hill shaped trajectories beautiful [4]. These findings elucidate the intricacies of story-telling through objective analysis, towards building informed skill development tools.

Creativity in Dynamic Networks. Currently, I am exploring how divergent thinking, a crucial component of the creative process, is impacted by one’s choice of peers in dynamic (self-organizing) networks [5, 6]. In contrast to ‘convergent thinking’, where people are expected to produce answers established to be correct (e.g., in school examinations), ‘divergent thinking’ leads individuals to come up with out-of-the-box responses to given prompts/situations [7]. In social networks, it is natural for people to make and break ties with others as time goes, leading the networks to be ‘dynamic’ [8]. For example, if someone seeks to excel in a certain skill, it is natural for him/her to form ties with people who have shown superior competence and success in that skill. In this experiment, our goal is to explore how divergent thinking performances are impacted by the dynamite of networks, where the subjects can self-organize during the experiment.

Research on soft-skills often faces the bottleneck that many of the outcome metrics are rather subjective and elusive in nature. Thus, manual human evaluation/annotation becomes important for generating meaningful feedback and enabling quantifiable data collection. This being the age of social media comes as a blessing: people are now connected to peers on-the-fly, and data collection tools are available right on our palms. My research aims to connect the dots therein: by helping end-users make the most of online networks to develop their soft-skills, while at the same time allowing them to add value back to their peers.


