

Work in Progress: The Antigua Forum Format: Increasing Information Flow for Increased Pedagogical Innovation

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Introduction

Pentland, in his book *Social Physics*, presents how the flow of ideas and information between individuals forms collective intelligence [1]. The concept of *idea flow* refers to “the way human social networks spread ideas and transform those ideas into behaviors.” They found that patterns of interaction, with no knowledge of content, can predict the effectiveness and productivity of a network and that social networks can be tuned to enhance collective intelligence, productivity, creativity, and innovation. Specifically, Pentland identifies a direct correlation between interactions amongst individuals of a group (electronic or in-person), the amount of information or idea flow, and the collective intelligence of the group. He describes how the collective intelligence of a group is dependent on how conversationally distributed conversations are amongst individuals in meetings. A group meeting dominated by one individual is much more susceptible to groupthink than a group who distributes talking amongst its members and encourages discussions to synthesize a deeper understanding and produce new and novel ideas. Therefore, to increase the productivity and the output of ideas and innovations within organizations, we must first increase the number of interactions amongst the group members to facilitate information or idea flow. Pentland suggests that the important ideas are likely to be found at water fountains or coffee pots, where individuals are more than likely to spark conversations.

In our work as part of NSF Revolutionizing Engineering Department (RED) grant, Teams for Creating Opportunities for Revolutionizing the Preparation of Students (TCORPS), we focus on the development of faculty to help develop skills and tools that will enable continuous improvement in teaching and curriculum and a community of practice for sharing learning. Inspired by Pentland’s work, we have explored various meeting and program structures to increase interaction and improve information flow regarding teaching innovation in our department. This paper describes our early work studying a format that is based upon the unconference concept [2] – the Antigua Forum Format [3, 4]. We are working to test the hypothesis that the format increases interaction and therefore information flow in the network, resulting in increased idea generation and pedagogical innovation.

An unconference meeting is self-organizing – such that, any individual is able to participate and converse about whatever it is they deem worthy of discussing for however long they deem necessary – and is designed to improve the sharing of ideas and the engagement of participants to ultimately stimulate learning [2, 5]. One study found that participants were more engaged and learned more in an unconference meeting as opposed to a traditional lecture style meeting [2]. The increase in interactions and discussions an unconference provides aids participants in increasing their understating, engagement, and production of ideas. Similar outcomes are capable of being produced from random conversations with individuals from opposite teams or disciplines during coffee or lunch breaks. Baumann and Boutellier point out that these conversations lead to exchanges of information that ultimately lead to the generation of creative ideas [6].

A team at Universidad Francisco Marroquin developed the Antigua forum structure, a co-creation style of the unconference format [4]. Like an unconference, the forum increases the opportunity for collaboration and discussion by minimizing the number of formal presentations and purposeful layout and facilitation of the interaction environment. One key difference between the Antigua Forum and the unconference is that the Antigua forum is purpose driven: the Antigua Forum has multiple stations, at which the station owner has a set up (e.g., a small set of figures or

an outline of some key points) to address important questions. In contrast, unconferences are often more unstructured and self-organizing as far as topic. This difference makes the Antigua forum format more suited for innovation, creating something new, and solving problems.

An important aspect of our TCORPS RED program has been the initiation of an annual departmental teaching retreat. As an Adaptation and Implementation grant, the original intent for the retreat was to follow the learnings of the ASU RED team and use the retreat to develop a common vision and mission for teaching in department using the Education Value Canvas [7]. The first retreat was conducted online via zoom during the Covid 19 pandemic using the Mural co-creation platform, an online digital whiteboard for teams to collaborate [8]. Mural enabled engagement of all faculty in the process and a vision and education value canvas was developed. A second major component of our project was teaching innovation processes to the faculty so they could better assess their teaching projects and engage in continuous experimental improvement. Although we anticipated that the Education Value Canvas would be the guiding principles for the faculty teaching innovators, as the first cohort of teaching innovators approached the one-year point, we realized that the sharing, learning, and frameworks that helped scaffold the innovation process throughout the year were engaging faculty more than the mission and value canvas. We decided to reformulate the teaching retreat in the Antigua Forum format with the purpose being sharing, reformulating, and learning about teaching innovation approaches in our department. The work presented here covers 4 teams disseminating their work and 5 new teams refining their ideas at one full day, on-campus departmental education retreat. The first cohort had worked for 1 year/1-2 semesters on their education projects and the second group were working on their proposals to participate in the next year’s program. The results highlight the outcomes of dissemination and new idea refinement in an Antigua forum format, in terms of faculty self-reported feelings of information exchange and idea generation. The education retreat studied had a morning and afternoon session with 35 and 34 faculty in attendance, respectively, including the RED team cohorts.

Methods

Antigua Forum

Table 1: The format of an Antigua forum was designed around five specific characteristics, each with an associated purpose.

Antigua Forum Characteristic	Purpose
<i>Purpose and outcome driven</i>	Ensures a reason for participation and use in scenarios where a goal must be achieved
<i>Space for collaboration and co-creation</i>	Ensures individuals can comfortably discuss and move around to all stations
<i>Self-organizing</i>	Participants choose the stations they interact with and for how long, freely moving among stations rather than being assigned or having a forced rotation time
<i>Facilitated</i>	Facilitators work with station owners ahead of the Forum time, meeting to set up stations and work boards to prepare for discussion, set guidelines for positive interactions during the

	meeting, and help ensure a smooth process at the stations
<i>Visual note taking and visible thinking</i>	Aids participants in sharing ideas with and sparking ideas from others

The Antigua Forum Format was developed to be self-organizing and focused on co-creation. It shares attributes with the unconference but retains the important aspect of being purpose driven [4]. The specific characteristics of the forum’s format and the purpose behind format attributes are outlined in Table 1. Guidelines help ensure maximal engagement and value extraction from the event. These guidelines include 1) listen to others, 2) say “yes *and*” (rather than “yes, *but...*”, which is really “no”) and build on other people’s ideas, 3) capture ideas on the sticky notes, and 4) to “share the air” to avoid one dominant voice in the conversation. The format for the Antigua style forum begins with an introduction to the format and sharing of the guidelines by the *Lead Facilitator*. That information session is followed by a quick (5 min or less per station) *pitch session* where station leaders present their topic and what they want to address later at their station. The station rotations then begin, allowing participants to interact at the stations they are interested in and share ideas with sticky notes on the station leaders’ solution boards (an example engineering education focused solution board is shown in Fig. 1). The time dedicated to this section is up to the event organizers. This phase for the departmental faculty retreat studied here was set at 45 minutes.

Original Goal or Student outcome improvement:			Increase overall class grades by 20%.
Ideas for improved goal or student outcome improvement:			
<ol style="list-style-type: none"> 1. More assignments 2. Longer class periods 			
Ideas to improve:	Ideas to experiment/test:	Ideas on how to measure success:	
	<div style="display: flex; flex-wrap: wrap; gap: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 45%;">Administer extra videos for students to view in free time</div> <div style="border: 1px solid black; padding: 5px; width: 45%;">Have students teach recitations</div> <div style="border: 1px solid black; padding: 5px; width: 45%;">Assign exploratory papers into subject</div> <div style="border: 1px solid black; padding: 5px; width: 45%;">Incorporate video games into class</div> </div>	<div style="display: flex; flex-wrap: wrap; gap: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 45%;">Student attendance to class</div> <div style="border: 1px solid black; padding: 5px; width: 45%;">Track student assignment satisfaction</div> <div style="border: 1px solid black; padding: 5px; width: 45%;">Track increase in quiz grades</div> </div>	
Resources needed:			
<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 25%;">Virtual Reality Computer Gear</div> <div style="border: 1px solid black; padding: 5px; width: 25%;">Video recording capabilities</div> </div>			

Figure 1: Example of station leader solution board with sticky notes from participants.

Station leaders are given a short period of time to assemble themes and learnings after the rotation section concludes. They then give *brief* (3 minutes or less) summary presentation of these learnings. This process of *pitch-rotation-share* can continue for multiple rounds, with station

leaders presenting what learnings after one full round and what they would like to discuss next, thereby initiating a new station rotation period.

Data Collection

Studying how the interaction network corresponded to idea exchange required quantifying the interaction occurring during the meeting. This was done using a participant interaction sheet, shown in Figure 2. Participant engagement levels, sentiment towards the Antigua style format, and whether they derived any new pedagogical ideas were also obtained via post-forum surveys.

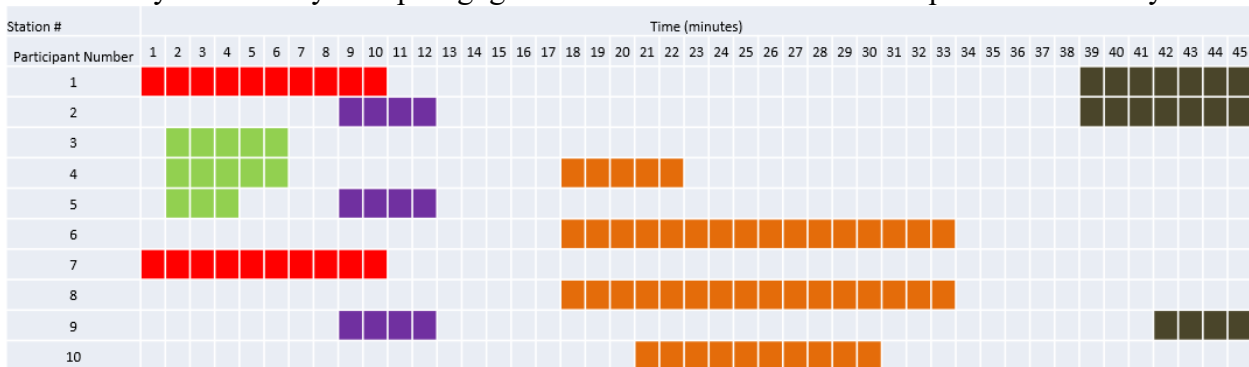


Figure 2: The interaction tracking sheet used to document participant information exchanges occurring every minute between participants i and j . The participant number refers to the random badge number assigned at the beginning of the event for consenting participants. The colors correspond to unique conversations, for example participants 1 and 7 talked for 10 minutes before concluding their conversation and moving on.

At the start of the event, participants read the IRB research disclosure for the Antigua Forum and collected a random badge number if they consented. The badge number enabled participant interactions to be tracked during the station rotation phase by student workers. Interactions were documented in the table shown in Figure 2 every minute (corresponding to the columns in the tracking sheet) as Participant i spoke to Participant j throughout the entire conference room, including stations, common spaces, snack bar, hallways, etc. Different colored markers indicated unique conversations, for example participants 1 and 7 talked for 10 minutes (shown in red in Fig. 2) before concluding their conversation and moving on. Student workers wore over-the-ear headphones to ensure they only tracked interactions between participants and did not overhear the actual conversations.

The department faculty teaching retreat studied here was broken into two rounds of pitch-rotation-share: one covering sharing of learning from the cohort of projects from the previous year and one for potential new cohort participants so that they could discuss and refine their ideas before final submission for selection in the cohort. Interaction also facilitated additional team formation for the cohort. A total of four Cohort 1 and six Cohort 2 teams participated. Participants were asked to take a post meeting survey to get feedback over their learning and sentiments for the event and the specific format of the event. The subjects ranked how much they agreed with a series of 4 statements associated with learning and new idea generation according to a 5 point Likert scale:

- 1) The teaching retreat stimulated/provided new ideas for pedagogical innovation.
- 2) Are you likely to attend another Antigua style forum?
- 3) I plan to implement ideas learned/developed at the retreat in my teaching.

4) How would you rate your engagement for this Antigua style format?

Data Analysis

Interaction sheets were collected at the end of the event and processed into interaction directional graphs like the ones shown in Fig. 3, connecting participants based on common conversations (colors in Fig. 2 interaction tracker sheets). The centrality of the resulting network directional graph models was then calculated using the Freeman Degree Centrality (Eq. 2, [9]). Freeman degree centrality provides a measure of the *overall* centrality of a network in terms of degree, the number of direct links between two nodes or in this case participants (Eq. 1, [10]). Degree centrality measures the importance of a node based on the total number of links the node has with others. Freeman degree centrality values closer to one indicate a more centralized network and closer to zero indicates a more decentralized network. Fig. 3 illustrates the concept of Freeman degree centrality for three sample networks. For Eq. 2, n is the total number of nodes in the network, $C_D(p^*)$ is the degree centrality of the most central node, and $C_D(p_i)$ is the degree centrality of node i . The numerator of Eq. 2 measures the difference between the most central node and the other nodes in the network. The denominator normalizes the value of the numerator between a value of zero and one. Freeman degree centrality was of interest here because of its ability to quantify the number of interactions amongst individuals, where a more centralized network would indicate low interactions amongst group members, and vice versa. A decentralized network is indicative of more interactions amongst individuals, which leads to increasing the amount of idea and information flow in the network, as pointed out by Pentland.

$$C_D = \sum_{j=1}^n A_{ij} \quad (1)$$

$$FC_D = \frac{\sum_{i=1}^n [C_D(p^*) - C_D(p_i)]}{n^2 - 3n + 2} \quad (2)$$

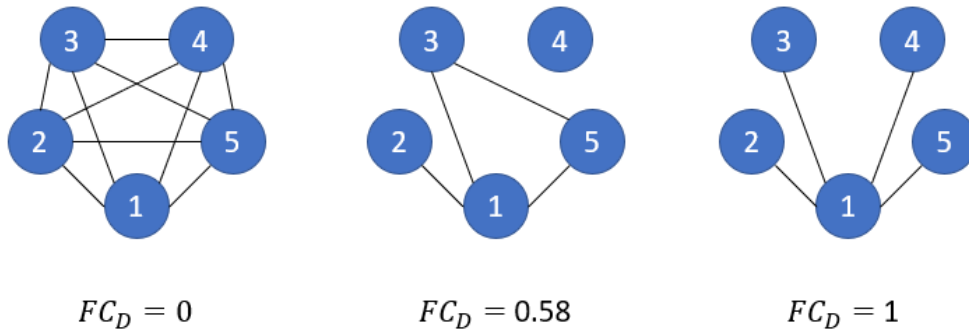


Figure 3: Visual Representation of Freeman Degree Centrality. The network on the left is the most decentralized, the middle network is more centralized than the left network, the network on the right is more centralized.

Results and Discussions

Figure 4 illustrates the cohort 1 (a) and cohort 2 (b) sessions of the department faculty teaching retreat. Table 2 summarizes the number of individuals in each session and the Freeman degree centrality associated with each session's Fig. 4 interaction network. The cohort 1 and cohort 2 sessions were both found to be decentralized, validating the unstructured rotation phase's goal

of the Antigua Forum format. The low centrality score (close to zero) indicates that almost every participant interacted with a larger number of other participants. Comparing the centrality scores of the Cohort 1 and Cohort 2 sessions, it is evident the Cohort 2 session had more unique conversation interactions occurring. This trend is also somewhat visible in Fig. 4, with more participants in Fig. 4a interacting with a main few. This is a positive result, since the cohort 2 session was focused on new idea refinement. The station heads who made their pitches also hosted each station, so some centrality around those participants was expected. Even in the first cohort, which was more dissemination oriented, the format appears to have been very successful in ensuring that the audience had a significant amount of participation during the rotation phases.

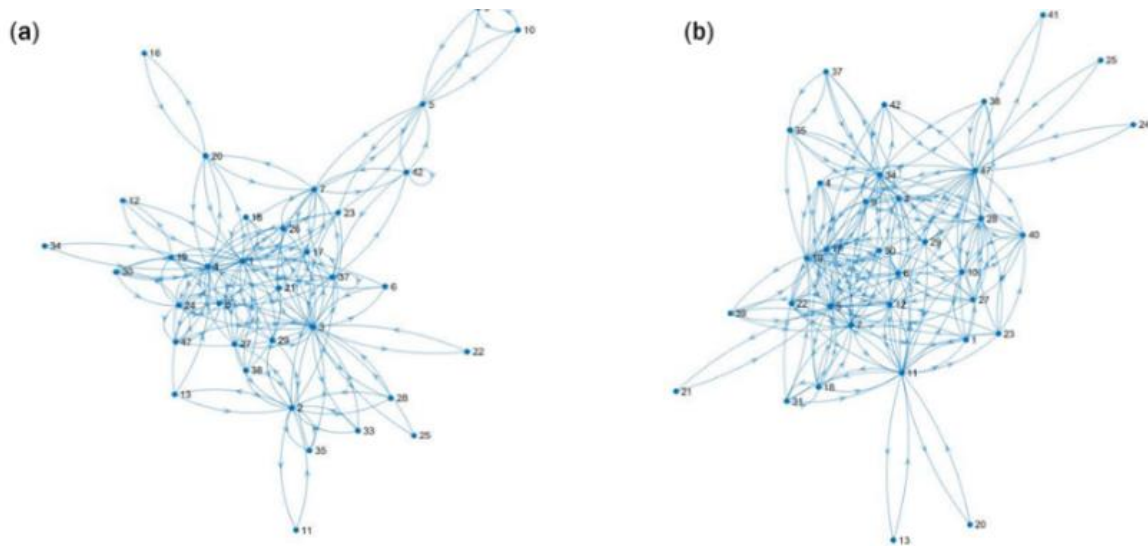


Figure 4: Results from April 2022 Antigua Forum's (a) Cohort 1 session with 35 individuals and (b) Cohort 2 session with 34 individuals. Nodes represent individuals and edges or links represent conversations between two individuals of any amount of time.

Table 2: Numerical description of the two Antigua forum sessions.

Session	Number of Individuals	Freeman Degree Centrality
Cohort 1	35	0.30
Cohort 2	34	0.15

Figure 5 shows the 29 responses to the four survey questions (a, b, c, d). Figure 5a and 5c indicate a high level of idea generation and usefulness of these generated ideas, with intention for participants to use them in their own work. Figure 5d indicates a high level of engagement by participants, which Petland also indicates is important for increasing information flow. Irrelevant to the hypothesis, but important for future teaching retreat participation and program sustainability, is question 5b, which indicates most participants were likely to attend another meeting. Incidentally, this retreat format was so popular that it was decided that a future departmental research retreat (which was supposed to be the control retreat for the study) would be changed to an Antigua forum format. The authors are still in the process of collecting control data in the form of a standard lecture style meeting. This control is needed to make any further conclusions about

decentralized information exchanges corresponding to improved information flow, although the results here are promising.

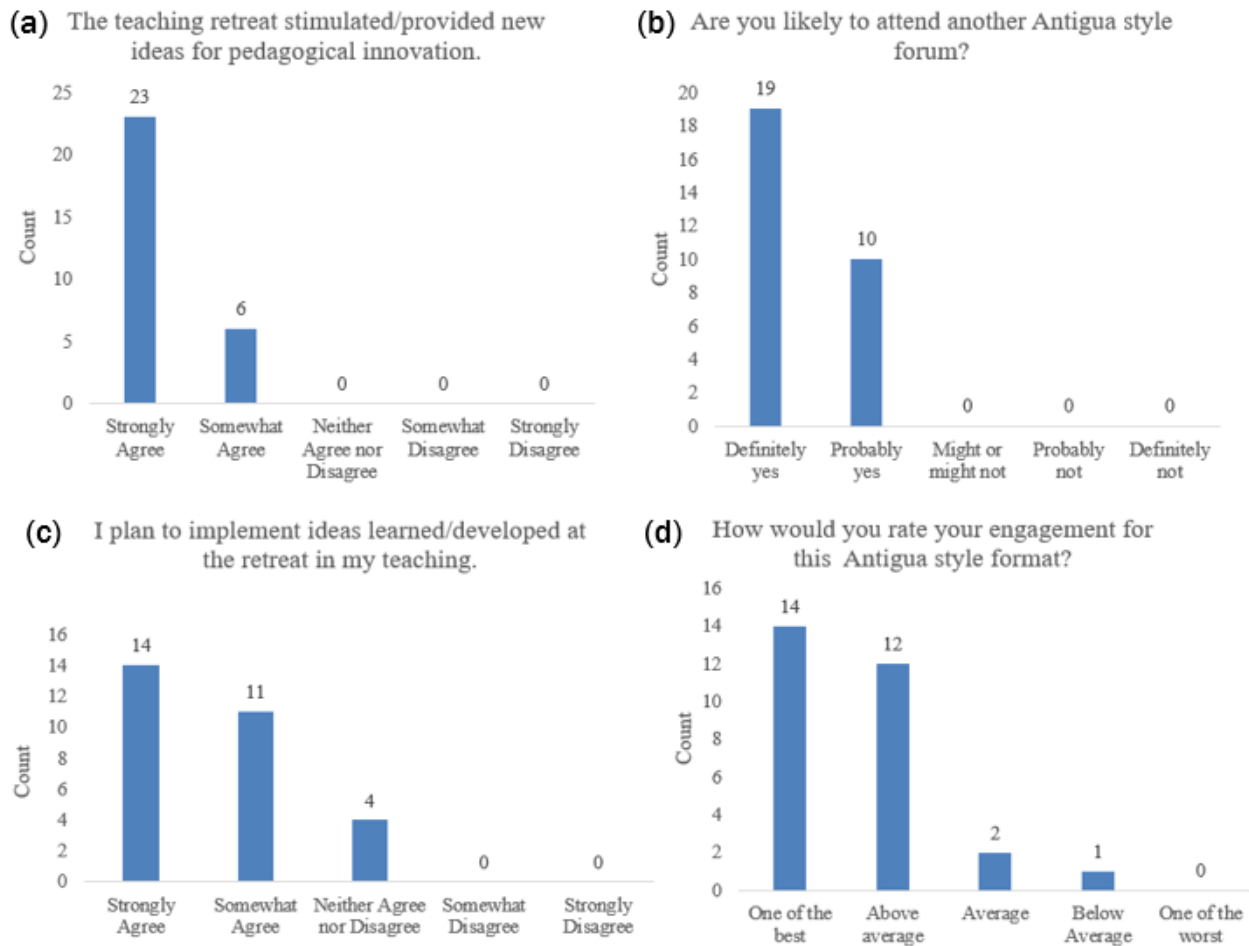


Figure 5: Survey Results for the following options (a) The teaching retreat stimulated/provided new ideas for pedagogical innovation, (b) Are you likely to attend another Antigua style forum?, (c) I plan to implement ideas learned/developed at the retreat in my teaching, and (d) How would you rate your engagement for this Antigua style format?

Conclusion

The low degree of Freeman centrality of the Antigua forum departmental teaching retreat appears to correspond to feelings of successful idea generation, the usefulness of the generated ideas, and participant engagement. Although still preliminary and not yet compared to a control meeting format, these results indicated that an Antigua forum format increases participant interaction and increases idea generation, as perceived by the participants. As these characteristics have been found to also correspond to innovation, the work here is continuing under the hypothesis that meeting and program structures that increase faculty interactions and discussions around teaching support increased generation of innovative ideas. Moreover, the feedback received from faculty participants indicates an overall enthusiasm for participating in an Antigua “flipped” style meeting. Future work will establish a control group to fully test this hypothesis.

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