

The Pandemic Leadership Model: A Study of Medical Student Values During COVID-19

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Abstract

Background: Leadership training in medical school continues to grow. Little information exists to guide leadership program development. Concurrently, the COVID-19 pandemic provides a real-world crucible of leadership, allowing insight into qualities and characteristics medical students value. We aim to determine what students value in leadership during a pandemic and the implicit framework students use. **Methods:** We conducted a cross-sectional, qualitative study using a five-item novel survey instrument developed by a consensus group of experts from family medicine, leadership development, medical education, and survey research to elicit student perceptions of effective and ineffective leadership qualities and examples during the COVID-19 pandemic at the University of Michigan Medical School. We used thematic analysis to identify overarching themes to build a model of leadership integrated with existing theory. **Results:** 162 students participated across all years of medical school. We identified themes of Communication, Other-Orientation, Personal Characteristics, Decisive Action, and Use of Information. These five themes were then built into the model of Pandemic Leadership within the context of complexity leadership theory and collective leadership theory. This model represents qualities and characteristics students value in good leaders during a crisis. **Conclusion:** This study is unique in its focus on student perceptions of leadership qualities during a real-world laboratory for leadership. We hope that this information, along with the pandemic leadership model, can serve as the first step toward relevant leadership training programs in medical education. Leadership training programs in medical education would likely benefit from grounding in the student values identified by this study.

Key Words: Leadership; Medical Education; Pandemic (Source: MeSH-NLM).

Introduction

Today's medical school graduates face a rapidly changing practice environment. From decreasing physician autonomy, to increasing interprofessional collaborative care, to unprecedented public health challenges like the COVID-19 pandemic, the challenges of practicing physicians continue to grow.¹ This requires a corresponding broadening of undergraduate medical education (UME) to face these novel challenges.

One critical factor required for a medical system to successfully adapt to rapid change is the presence of effective leaders. Leadership has been shown to be important in many medical contexts, with physicians' engagement in hospital leadership and management improving clinical outcomes and performance.^{2,3} Medical education curricula require a corresponding plan to prepare graduates to take on these leadership roles. While many studies have evaluated leadership development in graduate medical education and continuing medical education, there is a relative dearth of information surrounding training programs for UME.^{1,4-6} As such, medical students currently feel uninformed and unprepared about leadership and managerial roles within medicine and may face challenges navigating power dynamics within medicine.⁷⁻⁸

It is also crucial to ground training of medical students within relevant leadership theory.⁹⁻¹⁰ Upon review of existing structures, two relevant leadership frameworks were identified, called Complexity Leadership

and Shared/Collective/Distributive Leadership. Within these frameworks, leadership is seen as a complex system of interaction agents with unpredictable feedback networks which, in turn, output responsive results such as information-sharing, invention, and continued evolution to change.¹¹⁻¹³ Complexity and Shared Leadership provide an ideal framework for the interdependent relationships and dynamism of the medical field. These structures are also well-suited to examine the responses to the current global pandemic.

Additionally, little standard information exists about ideal leadership models or frameworks to shape program creation.¹⁴ In the UK, in order to shape curriculum development in leadership education, the National Health Service developed the "Medical Leadership Competency Framework", followed by the Healthcare Leadership Model.¹⁵⁻¹⁷ These leadership frameworks emphasize the need for quality improvement (QI) projects organized by students and increased use of simulation. Similarly, the accreditation body for Australian medical schools recommend medical leadership teaching and assessment but falls short of suggesting specific curricula for medical schools.^{18,19} Undergraduate medical education in the United States may benefit from a similar model, grounded in student understanding of leadership competencies. As a result of unclear standards and student values, current programs are highly varied, ranging from opt-in summer programs to longitudinal diversity training.²⁰⁻²²

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Although a recognized unmet need in UME, little literature exists on the values students require in leadership. There is a clear gap in the understanding of the implicit model of leadership that students hold and the values they look for in leaders. The current global pandemic brought to light the importance of leadership in medicine. The objective of this study is to determine, through qualitative survey, the values that medical students at the University of Michigan Medical School hold for leadership during a pandemic, in order to inform the further development of medical education curricula. Additionally, in order to place the results within context of leadership theory, we aim to determine a model for pandemic leadership from the perspective of medical student values.

Methods

Study Design

We conducted a cross-sectional, qualitative study of medical students at the University of Michigan Medical School. Survey results were anonymous and all responses were collected within seven days. All aspects of the study were approved by the University of Michigan Medical School's institutional review board (HUM00179411).

Setting

Our study took place at the University of Michigan Medical School. Students in all classes were invited to participate in the survey with a single email in April 2020, during a period when students were removed from the clinical setting and were taking an online "Pandemic Medicine" course.

Participants

Our survey was sent to medical students in all four classes. Each class comprises approximately 160 students, with a subset participating in dual degree programs such as MD/MBA or MD/MPH programs. All students at the University of Michigan Medical School were eligible to participate. Each participant received an anonymized individual link that was only accessible from an email address associated with medical school students to ensure no ineligible responses. To prevent duplicate responses, each link only allowed one response. Non-students were excluded as the survey was only sent to and accessible from a medical school email address. The first screen of the survey was an informed consent page, giving detail about the risk, benefit, and purpose of study. Participants were able to agree or decline participation in the study without consequences.

Variables/Measurement

The survey instrument was developed by a consensus group of experts from family medicine, leadership development, medical education, and survey research. The survey included five free-text questions assessing student perceptions of exemplary and poor leadership qualities. The full survey questions are shown in **Table 1**. The survey was administered via an online platform (Qualtrics, Provo, Utah).²³

Bias

In order to reduce bias in data collection and analysis, survey responses were anonymous. Each reviewer also followed the 15-point checklist of good thematic analysis presented by Clarke and Braun,²⁴ including generating codes and themes independently before undergoing intercoder agreement exercises. We additionally performed a participant pilot with six representative students across multiple class years to ensure ease of survey understandability and identify any potential issues in survey design that may have led to bias.

Study Size

Our study intended to gather a sample of student opinions from all four classes. The survey was sent to each classes' email list serve at the University of Michigan Medical School, reaching approximately 640 students. To ensure thematic saturation in our qualitative analysis, we aimed to collect information from 25% of all students (~160 participants).

Table 1. Free Response and Demographic Questions Surrounding Students' Views of Good and Poor Leaders in a Pandemic at the University of Michigan Medical School.

Question	Answer Method
What are some examples of good leadership that you have seen or experienced at any level (from your peers or class representatives through national/international leaders) during the COVID19 pandemic? Please be as specific as possible.	Free text
What do you think are the most beneficial or effective qualities/behaviors of leaders during a crisis like the current COVID19 pandemic? Please explain why.	Free text
What do you think are the most detrimental or ineffective qualities/behaviors of leaders during a crisis like the current COVID19 pandemic? Please explain why.	Free text
What, if anything, are you learning about others from observing their reactions or behavior during this time (including peers, friends, family, leaders)?	Free text
What, if anything, are you learning about yourself during this time?	Free text
What is your current phase of training?	Multiple Choice
How do you describe your gender identity? (Mark all that apply)	Multiple choice
Please select your age below	Multiple choice

Qualitative Analysis

To analyze the survey responses, we used a thematic analysis approach, following the 6 phases described by Braun and Clarke.^{25,26} The 6 phases are: "1. Familiarizing yourself with your data; 2. Generating initial codes; 3. Searching for themes; 4. Reviewing themes; 5. Defining and naming themes; 6. Producing the report."

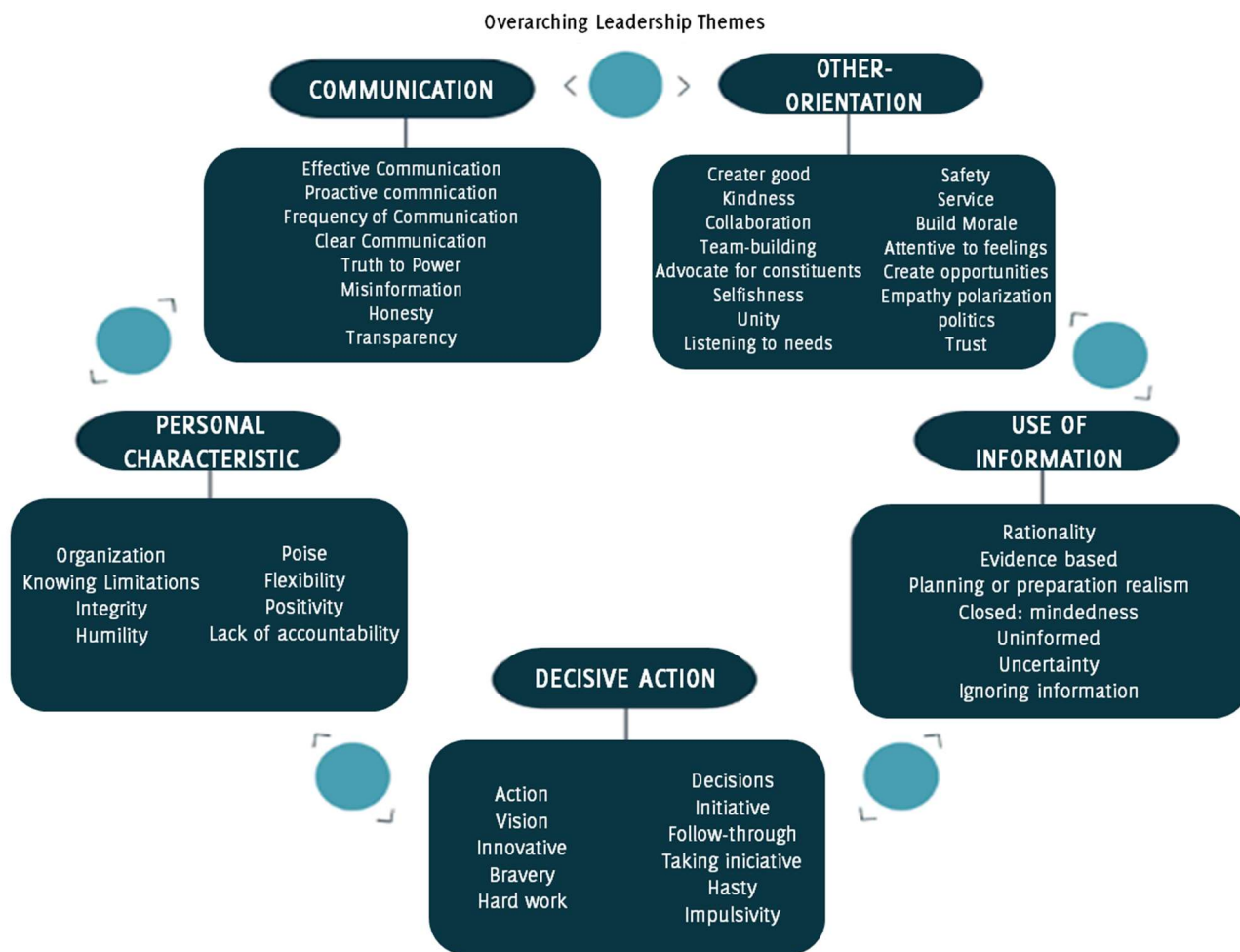
Specifically, we followed the following analysis process: Two authors (AB, SO) independently read the entire data set to familiarize themselves with the scope of the content. They recorded initial ideas and notes about possible future themes and codes. Then, four authors (AB, NK, EKJ, and SO) independently performed a line-by-line reading, and re-reading, of the first 20% of the responses. Each author produced a set of initial codes from the data.²⁴ The coders then underwent intercoder agreement exercises. Any coding disagreements were discussed between the coders until all coders agreed on a complete set of codes. Each coder then analyzed an additional 20% of the responses and one coder re-analyzed the initial 20% with the updated codes to ensure every response was reviewed by multiple authors in the analysis process.

Initial codes were then combined into common categories, which were then clustered to form overarching themes. This process was iterative and involved many re-readings of each section, refocusing analysis on broader levels of themes. Themes were evaluated based on the extent to which the theme captured sentiments expressed in the entire data set and encompassed codes. These themes were then reviewed by four authors and inter-coder agreement was achieved for all five themes. Themes were reviewed to ensure there was sufficient supporting data for each and that they are distinct from each other.²⁵ After ensuring the codes and underlying data are accurately represented by the themes, a candidate "thematic map" was developed (**Figure 1**) to indicate the interrelationships among themes.

Reflexivity Statement

This research is based in the University of Michigan Medical School, where the first two of the authors are students. The remaining authors are faculty at this institution. In addition, the lead author has a background in teaching and developing leadership curricula for outdoor education and wilderness programs. Answers to the survey questions addressed leadership both within and outside of the University of Michigan.

Figure 1. Leadership Themes Identified with Corresponding Sub-Codes from Response Data of Students at the University of Michigan Medical School.



Results

In total, of approximately 640 eligible students attending the University of Michigan Medical School, 162 students participated in the survey. **Table 2** displays the demographic characteristics of participants. Overall, 96 (59% of) study participants were female, and 62 (38%) were male. An additional 1 respondent identified as transgender or nonbinary, and 3 (2% of) respondents left this item blank. The median age was 25 (range, 22-39 years old), with broad representation from the four medical school classes with 32-49 (20-30%) from each year and 8 (5% of) respondents from dual degree participation. Specific reasons for non-participation were not assessed.

Table 2. Sociodemographic information for survey respondents.

Demographic Characteristics	Number	Percentage
Total	162	100%
Scientific Trunk (M1)	32	20%
Clinical Trunk (M2)	33	21%
Early Branches (M3)	49	30%
Graduating Branches (M4)	38	24%
Dual Degree/MSTP	8	5%
Female Students	96	59%
Male Students	62	38%
Other/Not listed	4	2%

Initial analysis of themes identified five overarching concepts related to leadership in a crisis, with corresponding sub-codes. **Figure 1** illustrates the major leadership themes that were identified: communication, other-orientation, use of information, personal characteristics, and decisive action, with the corresponding codes used in analysis.

The initial concept map with the above themes and codes was then revised into the pandemic leadership model, reflecting the interrelationships between the student themes (**Figure 2**). This model was compared with the codes and original data to ensure consistency and that it fully captured student perspectives. The use of the model and its relation to existing theory is explained in detail with further supporting responses in **Supplemental Appendix 1**.

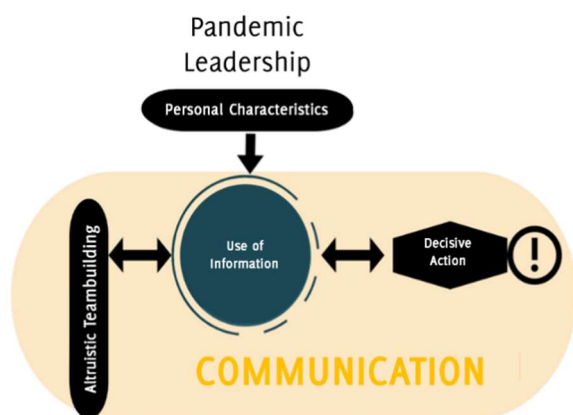
Sample responses and description of themes: Personal Characteristics:

Students referred to several interpersonal and character traits displayed by good leaders. “Effective leaders act with humility, integrity, and respect; they are willing to learn what they don’t already know about the situation, and willing to take feedback from those who are most impacted/who are not in leadership positions.” – 26-year-old female, Dual Degree Student.

Communication:

Study participants repeatedly described the essential nature of clear and consistent communication in pandemic leadership as well as its relationship to decisive action. Conversely, examples of ineffective communication were explained when discussing poor

Figure 2. The Pandemic Leadership Model was Derived from Student Perspectives of Leadership at the University of Michigan Medical School During the COVID-19 Pandemic.



leadership. “regular communication - people are especially hungry for information so communicating well can help to dispel fear” and that “the unknown scares people. Sharing as much information as possible helps morale...” -27-year-old female, Early Branch student (M3).

Other-orientation: This theme relates to both the ways leaders approach their communities and to building positive and effective teams. “A collaborative spirit is absolutely necessary to solve problems in real-time that we have never faced before” - 24-year-old female, Early Branches student (M3)

Decisive Action: The theme of taking initiative and bravery in decisions was central to students’ descriptions of good leaders in a crisis. “Great communication, thoughtful and decisive action, and willingness to get to work. I think all of these behaviors put the entire community at ease, and instill a certain sense of trust” -26-year-old male, Late Branches Student (M4).”

Use of Information: This central theme in the model of pandemic leaders refers to the gathering, use, and dissemination of information in crisis. “Good leaders spend more time listening to others than talking themselves, because it’s critical to be as fully informed as possible before making decisions.” -31-year-old male, Late Branch Student (M4).

Discussion

This study aimed to uncover the values that medical students desire from their leaders in the context of the current pandemic. Through qualitative approaches, five key themes were identified. The overarching values from the responses were examined through existing frameworks of leadership theory with a focus on Complexity Leadership theory and Shared/Collective Leadership for the purpose of informing medical school leadership curricula.

The theme of use of information arose in the context of what makes a good leader and is central to the model of excellent leadership according to medical students. This relates directly to the theory of Collective Leadership, where leadership exists as a system of connected networks.²⁶ These ideas parallel directly to student comments surrounding pandemic leadership. Leaders must know how to gather information involving planning and use evidence-based information to distribute the truth to the public. Students stated that good leaders use data and evidence to make their decisions. Respondents stressed the importance of grounding in realism and rationality in good leaders. This theme relates to current leadership curriculum at the University of Michigan Medical School and the recent emphasis on evidence-based medicine in both clinical practice and training. This finding suggests

that continued evidence-based medicine training and additional education in information digestion and synthesis is appropriate for inclusion in leadership training curricula.

The theme of “Other-orientation” was supported by many students’ comments. Other orientation refers to the ways in which leaders act in relation to those they lead or their communities at large. Students endorsed the need to be working toward the greater good, acting in service of others, and creating opportunities – labeled broadly as team building. Medical education has more recently been moving past the traditional emphasis on management of illness, with more weight being placed on team collaboration and interprofessional training,²⁷ directly supporting this expressed student value. At University of Michigan Medical School, this concept in leadership is taught through an exercise called the Leadership 360-degree evaluation, where feedback is solicited from evaluators from many different contexts and roles. This helps students to better understand the roles they play and their relationships to other aspects of the education and medical systems in which they interact.

Another major theme was that consistent communication is essential for good leaders. This finding serves as additional support for the recent push among undergraduate medical educators to include communication and interpersonal skills at all levels of medical training.^{28,29} This leadership theme is specifically taught at the University of Michigan Medical School with presentation and speaking skills sessions, teambuilding lessons, and training in challenging conversations.

Students described in detail the need for leaders to take decisive action in a crisis. Leaders must take initiative and follow through on their vision. Decisive action taken by leadership at the medical school level, both by other students and by administration, were aimed at responding to the crisis and creating new opportunities for people to help during the pandemic. Students value leaders who have bravery in how they pursued solutions and feel that the best leaders work hard to make those visions a reality. The connection between the pandemic leadership model and the existing frameworks of Complexity theory and Shared Leadership theory suggests their appropriateness for effective leadership in the current context. Both models emphasize the need to respond to changing and dynamic systems and act within the framework of the interconnections of diverse pieces.²⁶ The closest parallel to this leadership concept in the University of Michigan Medical School leadership training is the Capstone-for-impact project, where medical students are given the opportunity to “take on the society’s biggest challenges in health, health care and health system delivery while in medical school”.³⁰ Our findings suggest that programs like this are aligned with student values and may be useful as part of leadership training programs in additional settings.

There are some notable limitations to this study. First, the survey was designed to address student perceptions of leadership in a crisis. By design, the response characteristics will be focused on positive and negative leadership in response to the current global pandemic. While this provided a unique opportunity to develop theory in the real world and is very relevant to future challenges physicians may face, it may also limit the generalizability of the results to a broader leadership curriculum. Leadership in the context of everyday practice may not be exactly the same as leadership during a crisis and students may value different characteristics. Additionally, this study surveyed students at one large medical school in the United States and as such, these findings may not represent the values of medical students in other locations with different cultural milieus.

However, given the increasing prevalence and importance of leadership training curricula in medical education, this study hopes to be used as the first step in developing effective and relevant leadership training programs in undergraduate medical education. Our aim is that by developing the pandemic model of leadership, we provided a framework for understanding the implicit beliefs medical students hold about their leaders. Specifically, these models could be used in the

development of case studies, communication techniques, and skills grounded in the frameworks of these theories of leadership.

Current leadership education programs are not grounded in an understanding of the characteristics and values students look for in their leaders.^{10,11} Development of leadership curricula across medical education is limited without this understanding of the student views and attitudes towards ideal and poor leadership qualities. This framework, in turn, can be used to help inform future curriculum development. The connection between the pandemic leadership model and the existing frameworks of Complexity theory and Shared Leadership theory suggests their appropriateness for effective leadership in the current context. It is also important to note that there may be little to no space to add additional stand-alone leadership training content to full medical school curricula. Therefore, integrating

leadership training into longitudinal curricula with natural overlapping content may be necessary to ensure time and space for this essential training.

The context of a global pandemic provides a unique opportunity to find the values students look for in their leaders in the real world and fill this important gap, grounding medical school programs as they prepare students to meet the challenges of the future. Medical schools have an opportunity to better train their students to be leaders in crisis through specific training on the themes described above: information use and dissemination, decision-making and team-development, and communication skill. Leadership training programs in medical education would benefit from further grounding in these student values.

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Author Contributions

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Supplementary Material:

Supplemental Appendix 1: Detailed Review and Examples of Leadership Themes in Context

Student responses were analyzed for themes which are presented here in context, with examples.

Use of Information

The theme of information arose in many contexts surrounding the question of what makes a good leader and is central to the model of excellent leadership according to medical students. This central theme refers to both the gathering of information and the dissemination of information.

“Good leaders spend more time listening to others than talking themselves, because it’s critical to be as fully informed as possible before making decisions.” -31-year-old male, Late Branch Student (M4)

Use of information arose strongly in the passages about qualities of bad leadership as well, with particular emphasis placed on closed-mindedness and ignoring or avoiding information. Students felt that these qualities limited effectiveness in a crisis.

“Narrow-mindedness and stubbornness [limit effectiveness] because situations evolve so quickly you can’t get attached to any 1 idea or plan.” -male Dual-Degree Student

Other-Orientation-->Altruistic Team-building

This theme relates to both the positive values of the leader and the coalition and team-building activities of the leader. This theme is directly related to the interconnected nature of Complexity Leadership theory and integral to the Shared Leadership theory. “Other-orientation” refers to the ways in which leaders act in relation to those they lead or their communities at large. Several described the need to be working toward the greater good, acting in service of others, and creating opportunities -- labeled broadly as team-building.

Others discussed the characteristics of kindness, selflessness, and empathy in ideal leaders that they observed, leading to the altruistic label.

One student, discussing the importance of altruism during the pandemic, described the ideal leader as,

“someone who is approachable, kind and comforting in these times, while doing their best to help in any way.” -24-year old female, Scientific Trunk student (M1)

Many students discussed the need for team-building and working together. This emphasis on team-building to solve problems is present throughout student comments and is reflective of the collective leadership ideal that people are inherently most capable as a coalition.

When discussing examples of particularly bad leadership, students discussed polarization, politics and selfishness.

“Selfishness is detrimental because everybody is sacrificing something” -28-year old female, Clinical Trunk Student (M2)

These attitudes reflect a rejection of traditional leadership hierarchy in favor of collective leadership in a pandemic.

Communication

In pandemic leadership, communication serves as a central theme and the substrate and filter through which information flows to and from others for team-building and altruism. Communication is also the vehicle for decisive action and for communicating the results of those actions. Clear and consistent communication was also seen as important for leaders.

One student appreciated that, when writing about one of the leaders of the pandemic response:

“Effective communication includes giving the right amount of information, in the right platform, and organized in a way that emphasis[sic] key points” -female, Early Branches Student (M3)

The idea of regular and timely updates in order to address fears, communicate strategies, and provide information as situations evolve was present in a large plurality of student comments. This relates to the relationship of communication to others, for use in reassuring and supporting other teams.

When discussing poor leadership, communication remained a central theme, with students stating: “not having one constant message is very detrimental” and that “making false statements confuses the public, abolishes public unity, can lead to less trust in public health officials.” -25-year old female, Clinical Trunk Student (M2)

A lack of transparency or honesty, unclear communication and the spread of misinformation were held up as communication characteristics of bad leadership. Communication between systems is one of the central tenets of Complexity Theory and of Collective Leadership. This sentiment was paralleled in student comments about pandemic leadership.

Decisive Action

Students described in detail the need for leaders to take decisive action in a crisis, sharing that leaders must take initiative and follow through on their vision. Several students cited decisive action taken by leadership at the medical school level, both by other students and by administration. These actions were aimed at responding to the crisis and creating new opportunities for people to help during the pandemic. The leaders were described as having bravery in how they pursued solutions and that the best leaders worked hard to make those visions a reality. This is best described as the output or endpoint of the pandemic leadership model. In parallel with Complexity Theory, action is informed by and feeds back into information systems, forming an interconnected loop.

“Great communication, thoughtful and decisive action, and willingness to get to work. I think all of these behaviors put the entire community at ease, and instill a certain sense of trust” -26-year-old male, Late Branches Student (M4)

Students discuss the relationship of action with an understanding of others and of the complexity of the situation. Poor leaders were said to embody opposite characteristics, with one student commenting on laziness and lack of hard work.

“Laziness: “big idea” people can sometimes pitch their idea but not contribute to making it actionable, and this is further complicated by a

pandemic, when everyone is stretched thinly. If you're going to lead a team, you should be willing (and expecting!) to put in the most hours. Coattail riding: sort of articulated in the above points, but the craziness of a crisis makes it easier for behaviors like this to go unnoticed. This would leave me very disappointed in a leader." -23-year-old female, Scientific Trunk Student (M₃)

This speaks to the ineffectiveness of leadership that does not take the system and interrelatedness of the teams into account. This more isolated view of leadership is the converse to Complexity Theory and Collective Leadership and again affirms the fit of these models within effective pandemic leadership.

Personal Characteristics

The theme of personal characteristics refers to intrinsic traits and methods of acting of the leaders themselves. Participants described several personal traits that good leaders embody. These traits are strongly emphasized in the theory of Shared Leadership and deemphasized in more traditional hierarchical models of leadership.

Specifically, many discussed the need for humility in leadership, saying that it's very important for leaders to know their limitations.

"Effective leaders act with humility, integrity, and respect; they are willing to learn what they don't already know about the situation, and willing to take feedback from those who are most impacted/who are not in leadership positions." - 26-year-old female, Dual Degree Student

By discussing the need to receive feedback from other stakeholders in the system, this quote relates directly to Complexity Theory in relation to systems and situational approach. It also directly refers to the need to work with additional experts and lead a collective, again confirming the appropriateness of Collective Leadership theory in this case.

Poor leaders were described as arrogant and displayed a lack of accountability in their actions; characteristics that fit within the issues of traditional leadership theories. When describing negative leadership qualities, one student mentioned:

"Blaming others for one's own shortcomings. In this pandemic, this is particularly detrimental, when we see leaders emerging and offering their talents in new ways (i.e. the auto executives shifting production to respirators and ventilators), there is no reason to blame others. All of us can do something to help." -28-year-old female, Late Branches Student (M₄)

These actions of blaming others and avoiding responsibility are the antithesis of Shared Leadership and further support this model's effectiveness in complex situations such as a global pandemic.

In the Pandemic Leadership model (**Figure 2**), personal characteristics inform the use of information and altruistic team building, with unidirectional arrows. The intrinsic characteristics of the leader inform their orientation and response to the pandemic.