

Reimagining Educational Leadership: Enhancing Leaders' Capacity for Disruptive Innovation to Deal with Twenty-First Century Challenges in Higher Education

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Abstract—Higher education has coped up with the lowest proportion of young people who think they are likely to go to university. Generation Z (or Gen Z) whose age is 10-22 will be the students of today and university graduates, employees, and consumers of tomorrow. Thus, it's time to disrupt the higher education system especially on leadership. Leadership has changed during the 21st century. Disruptive leaders always have innovative minds, using an unconventional strategy or changing the traditional way upside down in order to get the necessary results. This study will ask the Ph.D. students as well as the administrators and instructors of Learning Innovation and Technology program, Faculty of Industrial Education and Technology, KMUTT how they think about today's leadership styles as well as their research. After survey, both Ph.D. students as well as the administrators and instructors perceived that disruptive leaders should possess all 21st century characteristics except for the following characteristics which are considered to be 20th century characteristics: Information, Male/Patriarchal Model, and Inside-Out. The results of the study should lead to effective leadership in the 21st century, and leaders need to understand how to adapt to new leadership styles.

Keywords—Educational Leadership, Disruptive Innovation, Higher Education

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I. Introduction

Our world is changing at a dizzying speed [1] to the extent that a disruptive innovation capability is mandatory and unavoidable [2]. Globalization, technological innovation, climate and demographic change are creating both new demands and opportunities [1]. Disruption today is happening at a large scale and speed is unprecedented in modern history [3]. From banking to retail, media, logistics, manufacturing, education, professional services, and life sciences, digital technologies and business models are transforming around the globe, and leaders are struggling to cope [3].

Leaders today face a big challenge when it comes to disruptive innovation [2]. The right leadership is critical for organizations to thrive in the rapid change of technology [3]. Leading disruptive innovation requires new mindsets and behaviors, for leaders themselves and for the organizations that develop them [2] because leadership plays a critical role in moving organizations to engage in essential “disruptive innovation” [4]. Such leadership is important because of the demand and importance of higher education [5]. New research from the Global Center for Digital Business Transformation, an IMD and Cisco initiative, and HR consultancy metaBeratung, shows that certain leadership attributes are particularly important to meet the demands of disrupted business environments. The results also demonstrate that relatively few of today's leaders possess them [3]. The report, *Redefining Leadership for a Digital Age*, presents finding from a global survey of more than 1,000 executives across 20 different industries [3]. The data revealed that even though 92% of leaders reported to be feeling the full force of digital disruption, less than 15% of them claimed to be “very prepared” to guide their companies through the eye of digital storm [3].

The need for innovation was a truly global phenomenon. Despite increased recognition for innovation in higher education and a growing acceptance of new leadership style of 21st century characteristics, there have been a limited number of research papers exploring the role of leadership in higher education innovation and providing few studies on the roles, processes, and outcomes [5]. Learning Innovation and Technology program, Faculty of Industrial Education and Technology, KMUTT to provide a leadership role in the development of disruptive innovation for the Ph.D. students as well as the administrators and instructors there is little known on how they think about today's leadership styles as well as

their research should consider to be disruptive innovation. The overreaching research question guiding this study was:

What is the role of 21st century characteristics of leadership in disruptive innovation in higher education?

II. Objectives

The objectives of this study were as follows:

- To find out the perception of the 20th century leadership characteristics as described by Ph.D. students as well as the administrators and instructors.
- To find out the perception of the 21st century leadership characteristics as described by Ph.D. students as well as the administrators and instructors.
- To compare the differences between the perception of the 20th and 21st century leadership characteristics as described by Ph.D. students as well as the administrators and instructors.

III. Conceptual Framework

- What is leadership?

Leadership [6] is a process of social influence (not authority or power), which maximizes the efforts of others (no mention of personality traits, attributes; there are many styles, many paths, to effective leadership), towards the achievement of goal (no influence with no intended outcome).

Disruption in Higher Education (HE) involves the capability to “innovate,” “transform,” or “be disruptive,” however, many leaders fail to do so. It must be stressed that innovation, transformation, and disruption are the means—the ends [7]. Innovation in its modern meaning is “a new idea, creative thoughts, new imaginations in form of device or method” [8]. Specifically, innovation is a means to solve complex problems that limit the ability to transform an organization into a more efficient, competitive, productive and relevant ecosystem. [6] According to Clayton Christensen’s 1997 book *The Innovator’s Dilemma*, disruption is defined as follows:

The process by which products and services, which at one point were so expensive, complicated, and inconvenient that only a small fraction of people could access them, become transformed into ones that are simpler, more convenient, lower in cost, and far more accessible [9].

Thus, in order for HE to move the barriers of becoming disruptive innovation, it involves careful planning and effective leadership.

Then, according to this research, a disruptive leadership is a multidimensional perspective or style of the 21st century leadership and gears towards Thailand 4.0. The characteristics of the 21st century skills would include thinking of four C’s (Critical Thinking, Creativity, Collaboration, and Communication): information literacy, technology literacy, and some other capacities, competencies and skills. To develop this kind of leadership, it should come from both

outward and inward perspectives for the sake of inclusiveness, collaboration, and of service, to individuals, the social good, and ecological sustainability.

IV Research Methodology

A. Population and Sampling Group

- The population of the study was the Ph.D. students as well as the administrators and instructors of Learning Innovation and Technology program, Faculty of Industrial Education and Technology (FIET), King Mongkut’s University of Technology (KMUTT), Thailand.
- The sampling group of the study consisted of 16 Ph.D. students as well as ten Ph.D. administrators and instructors of Learning Innovation and Technology program, FIET, KMUTT, Thailand who participated in this research on the voluntary basis.

B. Variables

- Independent variables are sex and age of Ph.D. students as well as the administrators and instructors.
- Dependent variables are the perception of the 20th century leadership characteristics and the 21st century leadership characteristics as described/evaluated by Ph.D. students as well as the administrators and instructors.

C. A Tool for Data Collection

The tool for data collection is a questionnaire with 39 characteristics on the 20th century and 39 characteristics on the 21st century characteristics of leadership [10]. The type of questionnaire is a forced choice scale of 20th century and 21st century characteristics of leadership. A forced choice scale (also known as an ipsative scale) is a rating scale that does not allow for an Undecided, Neutral, don’t know or no opinion response. It is used in order to force respondents to select the choice that describes their perception closest to their true feeling [11].

D. Data Analysis

The statistics utilized for data analysis were frequency and percentage. Then, in order to interpret 16 Ph.D. students’ perception on 20th century and 21st century characteristics of leadership, the meaning of each point scale would be as follows:

- 13.00 -16.00 = Strongly Agree
- 9.00 - 12.00 = Agree
- 5.00 - 8.00 = Disagree
- 0.00 - 4.00 = Strongly Disagree

To interpret ten Ph.D. administrators’ and instructors’ perception on 20th century and 21st century characteristics of

leadership, the meaning of each point scale would be as follows:

- 7.51 -10.00 = Strongly Agree
- 5.01 - 7.50 = Agree
- 2.51 - 5.00 = Disagree
- 0.00 - 2.50 = Strongly Disagree

IV. Research Results

A. General Data of Ph.D. Students as well as the Administrators and Instructors

There were ten Ph.D. administrators and instructors who participated in this research. Most of them were female (or 60% of all participants) whose age was over 45 years old (or 70% of all participants). As for sixteen Ph.D. students, most of them were female (or 68.75% of all participants) whose age was between 36-40 years old (or 37.50% of all participants).

B. Ph.D. students' as well as the administrators' and instructors' perception on the 20th century characteristics of leadership

Sixteen Ph.D. students' as well as ten Ph.D. administrators' and instructors' perception were calculated using the lowest and highest scores to show their perception of 20th century characteristics of leadership in Tables I and II. What's more, to show their perception of 21st century characteristics of leadership were shown in Tables III and IV.

Table I. shows that most Ph.D. students as well as the administrators and instructors agreed on their perception as in: no. 5 (Boss to Employee), no. 28 (National), no. 36 (Employee), and no. 37 (Work-Life Separation) as the lowest scores for 20th century characteristics of leadership.

TABLE I. THE LOWEST SCORES OF 20TH CENTURY CHARACTERISTICS OF LEADERSHIP PERECIVED BY PH.D. STUDENTS AS WELL AS THE ADMINISTRATORS AND INSTRUCTORS

The 20 th Century Characteristics of Leadership (The Lowest Scores)			
Ph.D. Administrators and Instructors		Ph.D. Students	
1 score		1 score	
15	Linear	13	Credentials
16	Inputs	18	Security
17	Time Management	27	Institution
20	Hidden Liabilities	30	Small Array of Leadership Styles
28	National	36	Employee
36	Employees		
37	Work-Life Separation		
2 scores		2 scores	
4	Top-Down	5	Boss to Employee
5	Boss to Employee	21	Autocrat/Micro Manager
23	Male/Patriarchal Model	28	National
26	Speak	37	Work-Life Separation
30	Small Array of Leadership Styles		

Table II. shows that most Ph.D. students as well as the administrators and instructors agreed on the perception as in: no. 3 (Inside-Out), and no. 9 (Information) as the highest scores of the 20th century characteristics of leadership.

TABLE II. THE HIGHEST SCORES OF 20TH CENTURY CHARACTERISTICS OF LEADERSHIP PERECIVED BY PH.D. STUDENTS AS WELL AS THE ADMINISTRATORS AND INSTRUCTORS

The 20 th Century Characteristics of Leadership (The Highest Scores)			
Ph.D. Administrators and Instructors		Ph.D. Students	
8 scores		10 scores	
9	Information	19	Specialist
9 scores		13 scores	
3	Inside-Out	1	Leadership
		3	Inside-Out
		9	Information

Table III. shows that most Ph.D. students as well as the administrators and instructors agreed on the following characteristics as in: no. 3 (Outside-In), and no. 9 (Judgment) as the lowest scores of 21st century characteristics of leadership as follows:

TABLE III. THE LOWEST SCORES OF 21ST CENTURY CHARACTERISTICS OF LEADERSHIP PERECIVED BY PH.D. STUDENTS AS WELL AS THE ADMINISTRATORS AND INSTRUCTORS

The 21 th Century Characteristics of Leadership (The Lowest Scores)			
Ph.D. Administrators and Instructors		Ph.D. Students	
1 scores		3 scores	
3	Outside-In	1	Service
		9	Judgment
2 scores		4 scores	
9	Judgment	3	Outside-In

Table IV. shows that most Ph.D. students as well as the administrators and instructors agreed on the following characteristics as in: no. 22 (Integrated Life), no. 27 (Network), no. 36 (Team Members), no. 13 (Lifetime Learning), and no. 18 (Adaptability) as the highest scores of 21st century characteristics of leadership as follows:

TABLE IV. THE HIGHEST SCORES OF 21ST CENTURY CHARACTERISTICS OF LEADERSHIP PERECIVED BY PH.D. STUDENTS AS WELL AS THE ADMINISTRATORS AND INSTRUCTORS

The 21 th Century Characteristics of Leadership (The Highest Scores)			
Ph.D. Administrators and Instructors		Ph.D. Students	
9 scores		14 scores	
15	Intuitive	5	Leader to Leader
16	Outputs	22	Integrated Life
17	Value Management	27	Network
28	Global Local	30	Infinite Leadership Styles
29	Consent Earned	36	Team Members
31	Redeployment		
36	Team Members		
37	Work-Life Integration		
10 scores		15 scores	
2	Relationships	13	Lifetime Learning
7	Effective	18	Adaptability
10	Value in People		
13	Lifetime Learning		
18	Adaptability		
22	Integrated Life		
27	Network		

C. Comparing the differences between Ph.D. students' as well as the administrators' and instructors' perception on 20th and 21st century characteristics of leadership

The differences of Ph.D. students' as well as the administrators' and instructors' perception as identified in Table I to Table IV were compared as shown in Table V to Table VII in order to find out the most agreement of leaders' capacity for disruptive innovation to deal with the 21st century challenges in HE.

Table V shows that when the highest scores of 20th century and the lowest scores of 21st century characteristics of leadership were compared, it revealed that the Ph.D. students as well as the administrators and instructors agreed to strongly agree on 20th century but strongly disagreed on 21st century characteristics of leadership as follows:

- a. Information-Judgment
 - Information (20th Century Characteristics)-
 Agree (Ph.D. Administrators and Instructors)
 Strongly Agree (Ph.D. Students)
 - Judgment (21st Century Characteristics)-
 Strongly Disagree (Ph.D. Administrators and Instructors)/ Strongly Disagree (Ph.D. Students)
- b. Inside-Out-Outside-In
 - Inside-Out (20th Century Characteristics)-
 Strongly Agree (Ph.D. Administrators and Instructors)/ Strongly Agree (Ph.D. Students)
 - Outside-In 21st Century Characteristics)-
 Strongly Disagree (Ph.D. Administrators and Instructors)/Strongly Disagree (Ph.D. Students)

Thus, it could be concluded that Ph.D. students as well as the administrators and instructors need to be enhanced on the capacity of "Judgment and Outside-In" for the 21st century characteristics of leadership when they deal with the challenges in HE. This will lead to our discussion at the end of this paper.

TABLE V. THE MATRIX BETWEEN HIGHEST SCORES OF 20TH CENTURY AND THE LOWEST SCORES OF 21ST CENTURY CHARACTERISTICS OF LEADERSHIP PERCEIVED BY PH.D. STUDENTS AS WELL AS THE ADMINISTRATORS AND INSTRUCTORS

Leadership	
The 20 th Century Characteristics	The 21 st Century Characteristics
The Highest Scores (Administrators and Instructors/ Students)	The Highest Scores (Administrators and Instructors/ Students)
9. Information (7 = Agree / 13 = Strongly Agree)	13. Lifetime Learning (10/15-Strongly Agree)
3. Inside-Out (9/13-(Strongly Agree)	18. Adaptability (10/15-(Strongly Agree)
	22. Integrated Life (10/14-(Strongly Agree)
	27. Network (10/14-(Strongly Agree)
	36. Team Members (9/14-(Strongly Agree)

TABLE V. (CONT.)

Leadership	
The 20 th Century Characteristics	The 21 st Century Characteristics
The Lowest Scores (Administrators and Instructors/ Students)	The Lowest Scores (Administrators and Instructors/ Students)
28. National (1/1 Strongly Disagree)	3. Outside-In (1/4-Strongly Disagree)
36. Employees (1/1 Strongly Disagree)	9. Judgment (2/3-Strongly Disagree)
37. Work-Life Separation (1/2 (Strongly Disagree)	
5. Boss to Employee (2/2 (Strongly Disagree)	

Additionally, Table V shows that when the lowest scores of the 20th century and the highest scores of 21st century characteristics of leadership were compared, it revealed that Ph.D. students as well as the administrators and instructors strongly disagreed on the 20th century and 21st century characteristics of leadership as in: National-Global, Work-Life Separation-Work-Life Integration, and Boss to Employee-Leader to Leader.

Table VI shows that most of Ph.D. students as well as the administrators and instructors disagreed on no. 23 (Male/Patriarchal Model) for 21st century characteristics of leadership. Thus, there is a need to enhance "Female/Inclusive Model" on the capacity for 21st century characteristics of leadership when they deal with the challenges in HE. This will also lead to our discussion at the end of this paper.

TABLE VI. THE MATRIX BETWEEN THE LOWEST SCORES OF 20TH CENTURY AND THE HIGHEST SCORES OF 21ST CENTURY CHARACTERISTICS OF LEADERSHIP PERCEIVED BY PH.D. ADMINISTRATORS AND INSTRUCTORS

The Ph.D. Administrators and Instructors			
The 20 th Century Characteristics		The 21 st Century Characteristics	
The Lowest Scores	The Level of Agreement with the 21 st Century Characteristics	The Highest Scores	The Level of Agreement with the 20 th Century Characteristics
1 score		9 scores	
15. Linear		15. Intuitive	
16. Inputs		16. Outputs	
17. Time Management		17. Value Management	
20. Hidden Liabilities	20. Undiscovered Value (Strongly Agree)		
28. National		28. Global	
		29. Consent Earned	
		31. Redeployment	
36. Employees		36. Team Members	
37. Work-Life Separation		37. Work-Life Integration	
2 scores		10 scores	
4. Top-Down	4. Bottom-Up (Strongly Agree)	2. Relationship	

TABLE VI. (CONT.)

Ph.D. Administrators and Instructors			
The 20 th Century Characteristics		The 21 st Century Characteristics	
The Lowest Scores	The Level of Agreement with the 21 st Century Characteristics	The Highest Scores	The Level of Agreement with the 20 th Century Characteristics
5. Boss to Employee	5. Leader to Leader (Strongly Agree)	7. Effective	
23. Male/Patriarchal Model	23. Female/Inclusive Model (Somewhat Disagree)	10. Value in People	
26. Speak	26. Listen (Strongly Agree)	11. Collaboration	
30. Small Array of Leadership Styles	30. Infinite Leadership Styles (Strongly Agree)	13. Lifetime Learning	
		14. Soft Skills	
		18. Adaptability	
		21. Coach, Conductor	
		22. Integrated Life	
		24. Virtual	
		27. Network	
		32. Stepping Stone	

Table VII shows that most of Ph.D. students strongly agreed on the 21st century characteristics of leadership.

TABLE VII. THE COMPARISON BETWEEN THE LOWEST SCORES OF 20TH CENTURY AND THE HIGHEST SCORES OF 21ST CENTURY CHARACTERISTICS OF LEADERSHIP PERCEIVED BY PH.D. STUDENTS

Ph.D. Students			
The 20 th Century Characteristics		The 21 st Century Characteristics	
The Lowest Scores	The Level of Agreement with 21 st Century Characteristics	The Highest Scores	The Level of Agreement with 20 th Century Characteristics
1 score		14 scores	
13. Credential		5. Leader to Leader	
18. Security		22. Integrated Life	
27. Institution		27. Network	
30. Small Array of Leadership Styles		30. Infinite Leadership Styles	
36. Employees		36. Team Members	
2 scores		15 scores	
5. Boss to Employee		13. Lifetime Learning	

TABLE VII. (CONT.)

Ph.D. Students			
The 20 th Century Characteristics		The 21 st Century Characteristics	
The Lowest Scores	The Level of Agreement with 21 st Century Characteristics	The Highest Scores	The Level of Agreement with 20 th Century Characteristics
21. Autocrat/Micro Manager	21. Coach, Conductor (Strongly Agree)	18. Adaptability	
28. National	28. Global (Strongly Agree)		
37. Work-Life Separation	37. Work-Life Integration (Strongly Agree)		

v. Conclusion and Discussion

From the research results, we have found that Ph.D. students' as well as the administrators' and instructors' perception could imply that these following characteristics as in: "Judgment, Outside-In", and "Female/Inclusive Model" need to be enhanced for the 21st century characteristics of leadership when leaders deal with the challenges in HE. This would lead to our discussion as follows:

- Information-Judgment
- Inside-Out-Outside-In
- Male/Patriarchal Model- Female/Inclusive Model

a. Information-Judgement

The term "information" means processed data about someone or something [12]. We have always been told that information is power. But this is not exactly true. Data, in itself, is nothing or almost nothing. A transformation process is needed to convert data into information that is valuable after an analysis [13]. The inquirer makes judgments about the information that they receive and formulates theories which are then tested. The process is active and iterative as seen in Figure 1[14].

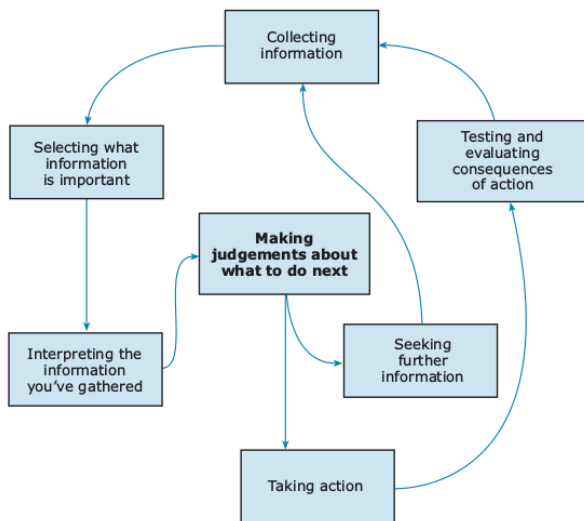


Figure 1. A process of productive inquiry[14]

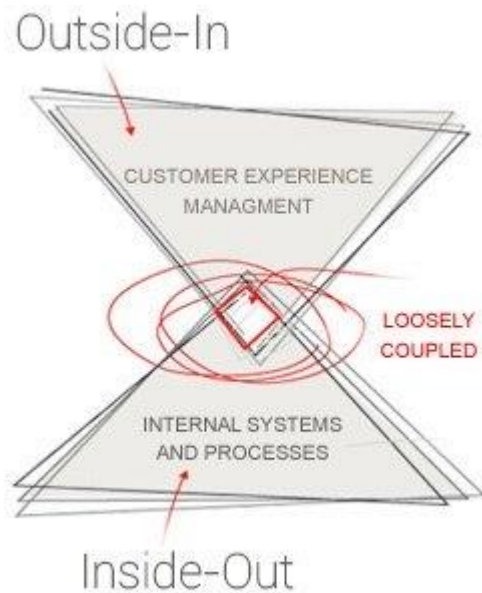


Figure 2. “The Inside-Out + Outside-In = Success” [17]

So many things in life rely on good judgment. We often find ourselves in situations where there are no right or wrong answers. Our final decision comes down to a matter of judgment. [15] Looking ahead, our appreciation will surely shift from admiring the judgment of great leaders to instead revering the leadership of judgment [16].

b. *Inside-Out-Outside-In*

Studies have also shown that innovation processes involving customers, especially lead users, are more likely to succeed in the market place since they just have better and more creative ideas than internal product developers [17]. As Ozeritskaya (2015) explained, “the Inside-Out approach is guided by the belief that the inner strengths and capabilities of the organization will produce a sustainable future.” On the other hand, she mentioned that “the Outside-In approach is instead guided by the belief that customer value creation is the key to success” [17], [18]. In this study, it can be suggested that success occurs when leaders are able to combine their Inside-Out strategy with a good understanding of their customers’ needs, challenges and lifestyles. In fact, both Inside-Out and Outside-In strategies are required to achieve a successful disruptive innovation as shown in Figure 2.

c. *Male/Patriarchal Model-Female/Inclusive Model*

To optimize leadership effectiveness of men and women, it is important to go beyond consideration of the biological sex of the individual and simplistic generalizations of what makes a male leader or a female leader successful. It is important to consider if and how gender relates to leadership. Gender is an individual difference characteristic that is relevant to how people think about themselves, how they are thought about by others, and how they act in various situations. Gender, therefore, involves how it relates to leadership effectiveness [19]. Inclusive leadership is essential and it is important to make sure that diverse thinking is respected, managed, heard and applied. Inclusive leaders who understand how different thinkers react to change are uniquely prepared to communicate and influence in a way that helps everyone to express new ideas and new ways of doing things. [20] Such inclusion would be value co-creation, collaborative learning and innovation processes [21].

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