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# Do "Differences in Speed" Affect the Process of Integrating Program Management and Systems Engineering?

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# Impact of Pace, Timing and Sequence on Integration Work of Project Managers and Systems Engineers

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**(Preliminary, and Incomplete, Draft)**

**"Time is often treated as an invisible factor in teamwork instead of as a strategic element." --Rhetta Standifer, Researcher**

**What if time consideration factors make the difference between success and failure?**

**Organizations today rely on knowledge workers to be successful. They are more productive when they can work together with less conflict. One key factor in reducing conflict is developing awareness and consideration about how time affects workers.**

**A recent study demonstrated the value of developing teams that acknowledge the importance of time and develop a shard consciousness regarding time. This study showed a direct positive relationship between "shared temporal cognition" and team satisfaction. (Standifer, et al, 2015)**

**J. R. Hackman (2002) states that researchers and practitioners are interested in understanding team experiences that generate team satisfaction.**

**Why should you care about team satisfaction? It is because knowledge workers will not stick around if they are not happy. They will just get another job. This can mean that some companies have a hard time with employee retention. This can be a very expensive problem which has a huge impact on the long term success of an organization.**

**A study was done that looked at motivational factors that promote employee retention. Job characteristics, among other factors, were identified as key motivational factors in employee retention. "Job Characteristics" is defined as the degree freedom, independence and discretion to the individual to schedule work and determine the procedures used to carry it out. (Aguenza, et al, 2012) Time considerations certainly fit into that category.**

**Research has shown that the design of highly skilled employee's work content does influence the stability of the work force. (Amabile, T. M., et al, 1996). Design includes decisions about the pace, timing and sequence of work processes.**

**Richard Walton, of Harvard University, pointed out that a certain degree of "autonomy" and ability of a worker to control their own work rather than submit to external controls, is important to the "quality of work life" of employees. (Walton, 1973). This is much harder to establish when**

**people from different disciplines have to work together in order to accomplish organizational objectives.**

**In particular, Project Managers and Systems Engineers must work together in order to implement effective projects that are commercially successful. Eric Rebentisch, of MIT, and other researchers, believed that the better integrated Program Management and Systems Engineering is, the better the performance of the program. Their 2017 research study did show that program performance is positively correlated with increased integration between the two disciplines. His book, written the same year, elaborates on how these two disciplines can be better integrated.**

**The book includes a table that compares the processes and procedures involved during each stage of the life cycle of a typical program. (See Below)**

**Table 11-3: Generic program management and systems engineering life cycle integration**

| Program Life Cycle Activities | Purpose/Activities | Processes and Procedures |
|---|---|---|
| Concept and Setup | Program setup; benefits and business case analysis | PMI (2013a) 1.1–1.7, 2.1–2.5, 3.1–3.3, 4.1–4.4.2, 7.1 |
| | Preliminary concept Concept selection | INCOSE (2015) 2.1–2.11, 3.1–3.6, 4.1–4.3 |
| Definition and Planning | Identify organizational structures and activities to be integrated | PMI (2013a) 4.3, 5.1–5.3, 6.1–6.6, 7.1.1, 8.3.1–8.3.5 |
| | Refine stakeholders' needs; Define requirements for production, training, and support | INCOSE (2015) 4.4–4.8, 5.1–5.3 |
| Requirements and Specifications Development | Integration of components (cost, schedule, risk, safety, quality assurance, testing, validation) | PMI (2013a) 8.1–8.9 |
| | System analysis is performed Specify, analyze, and design system Planning and execution of activities | INCOSE (2015) 5.4–5.8, 6.1–6.2, 7.1–7.6 |
| Controls, Inspection, and Verification | Control risk, safety, quality assurance, testing, and verification | PMI (2013a) 8.5, 8.7, 6.6.4 |
| | Produce systems; Inspect and verify | INCOSE (2015) 4.9–4.12, 8.1–8.6 |
| Benefits Delivery and Transition to Operations; Lean Systems Engineering; Interoperability Analysis | Monitor performance of benefits | PMI (2013a) 4.3, 7.1.2, 7.1.4 |
| | Operate system to satisfy users' needs | INCOSE (2015) 9.1–9.9, 10.1–10.7 |
| Sustainability, Reliability, and Resilience | Ensure continued sustainability of benefits | PMI (2013a) 4.4–4.5, 8.3.6 |
| | Provide sustained system capability | INCOSE (2015) 10.8–10.14 |
| Closure, Archive, and Benefits Sustainment | Ensure benefits sustainment and document lessons learned | PMI (2013a) 7.1.3, 8.3.6, 8.3.7 |
| | Store, archive, or dispose of the system | INCOSE (2015) 4.13–4.14 |

(From "Integrating Program Management & Systems Engineering", p. 229, by Eric Rebentisch, Editor, John Wiley & Sons, Inc., Copyright 2017)

**Each stage, or phase, has specific standards that are specified. For Program Management, the PMI institute has set standards. For Systems Engineering, INCOSE has set standards. In 2011, the two professional organizations formed an alliance to try to bridge the gap between the two**

**disciplines because of the "silo thinking" that had developed that interfered with collaboration and cooperation between the two groups.**

**The problem with not having good collaboration is that it can cost a lot of money. Considering only failed IT projects in the U.S., a Gallup pole in 2018 showed that these projects cost the U.S. $50-$150 billion in lost revenue and productivity. A McKinsey study showed that software projects have a cost overrun of 66% and non-software projects have cost overrun of 43%.**

**A 2017 study by software development firm Geneca, found that 78% of business executives felt that their business was usually or always "out of sync" with project requirements. Furthermore, they felt that business stakeholders needed to be more involved and engaged in the requirements process.**

**Rebentisch has provided evidence that better integration between Program Management and Systems Engineering does result in better outcomes. This study aims to answer questions regarding whether speed (timing) or temporal issues enhance or detract from integration, and ultimately commercial success. (See Visual Below)**

**This visual illustrates the Conceptual Model for the research. Essentially, three temporal constructs, Pace, Timing, and Sequence are proposed to impact communication, which impacts integration, which in turn impacts the degree of commercial success of a project. In addition, it shows another connection, which is to "Retention". Pace, Timing and Sequence may influence employee retention, in the long run. They may have an influence because if they affect employee satisfaction, it can be argued that they will also affect retention because satisfied employees are more likely to stay than unsatisfied employees.**

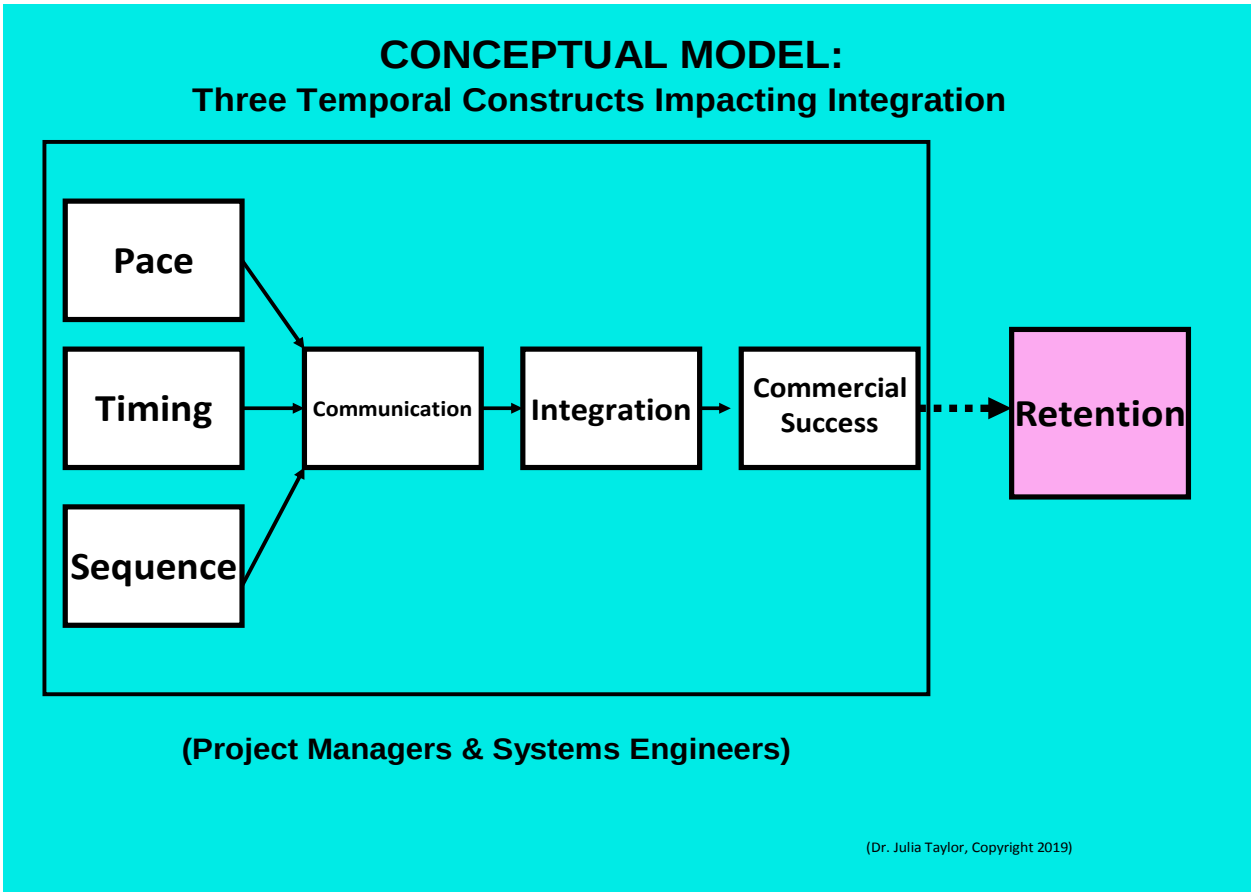
**Additional questions include:**

***Does Pace, Timing and Sequence have an impact on Communication?**
***Does Pace, Timing and Sequence have an impact on Integration?**
***Does Pace, Timing and Sequence have an impact on Commercial Success?**
***Does Pace, Timing and Sequence influence the level of employee satisfaction?**

**Although not covered by this research, the question about whether Pace, Timing and Sequence have an impact on retention, is another interesting question.**

**This research involves asking the above questions for the first three of the seven stages, that were identified by Rebentisch, that make up the life cycle of a typical program. The first three were chosen because of the author's assumption that the beginning of a project is the most crucial, and has the greatest impact on the outcome. (If all goes well, the other four**

**stages will be researched later, so that there will be a comparison of all seven stages.)**

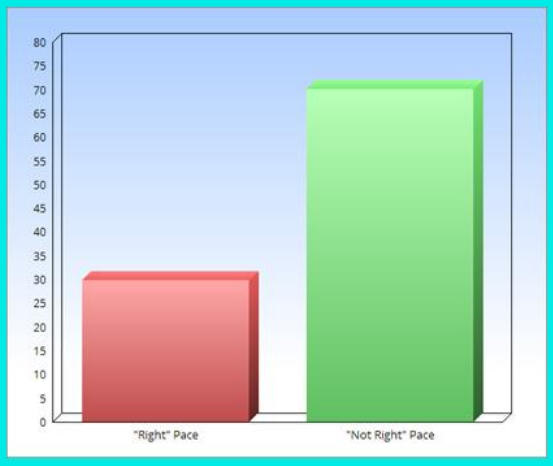



**As of August 15, 2019 about 100 people have responded to the survey, about half are Program Management professionals and the other half are Systems Engineers. Responses are still coming in. The more responses, the more likely it is that some statistically significant results will be found.**

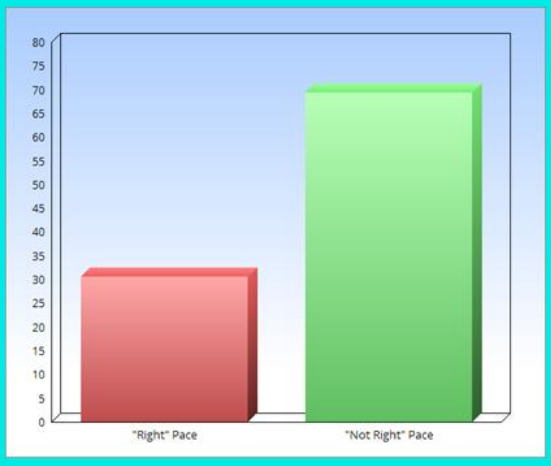
**At this early point in time, it is clear that in general everyone feels like they work very fast, and even still are often late with the work at each phase. In terms of finding something new: Sequence appears to be rather important. There was a lot of dissatisfaction regarding the "Sequence" of events. Communication is deemed better by Program Management than by Systems Engineering.**

**More specifically, the variable "Pace" results show that both Program Management and Systems Engineering felt like the pace was not right during the "Concept & Set-up Phase". (See Below)**

# PACE RESULTS "Concept & Set-Up Phase":




Project/ Program Management




Systems Engineering

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