Design of Information Systems: Simulating the Effectiveness of Knowledge Transfer Throughout the System Analysis Phase.

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Agenda

- Challenges
- Problem Statement
- Definitions
- Analysis
- Dynamic Hypothesis
- Model Structure and Feedback Loops
- Policy Simulation
- Future Research

Challenges

- One of the critical issues determining the successful development of information systems is what might be described as the communication gab between the user group and the IS development group that occurs during the system analysis phase.

Problem Statement

- The bigger the knowledge gab between the two groups, the less efficient the systems analysis team will be.

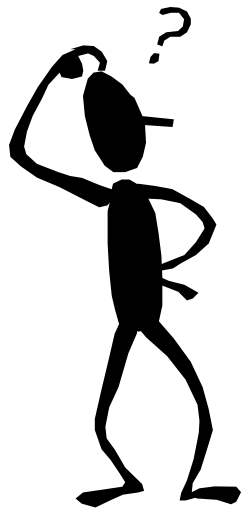
User

Developer

Explicit knowledge:	Vocabulary (A-Z)	Vocabulary (E-Q)
Tacit knowledge:	Maturity	Rookie

Definitions

Tacit knowledge:
entails “stuff” that
is difficult to express,
formalize, or share, i.e.
business acumen.



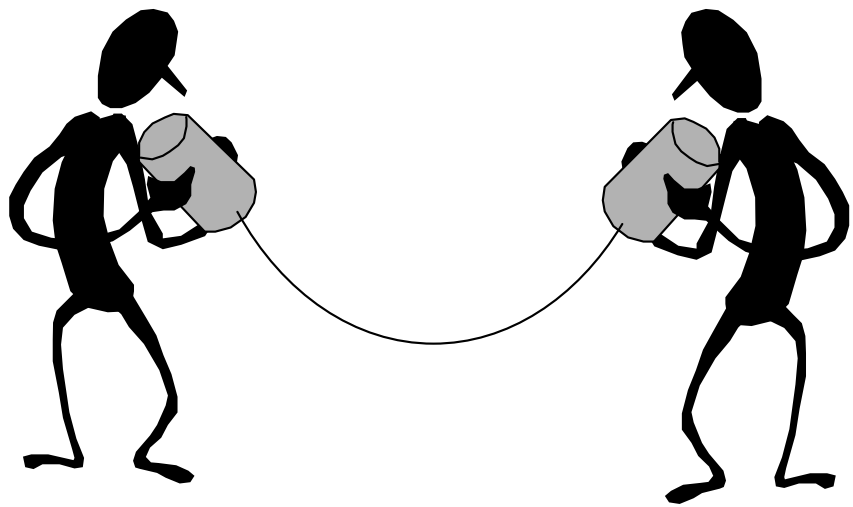
Explicit knowledge: what a person can articulate, such as the personnel policy of a firm.

Definitions

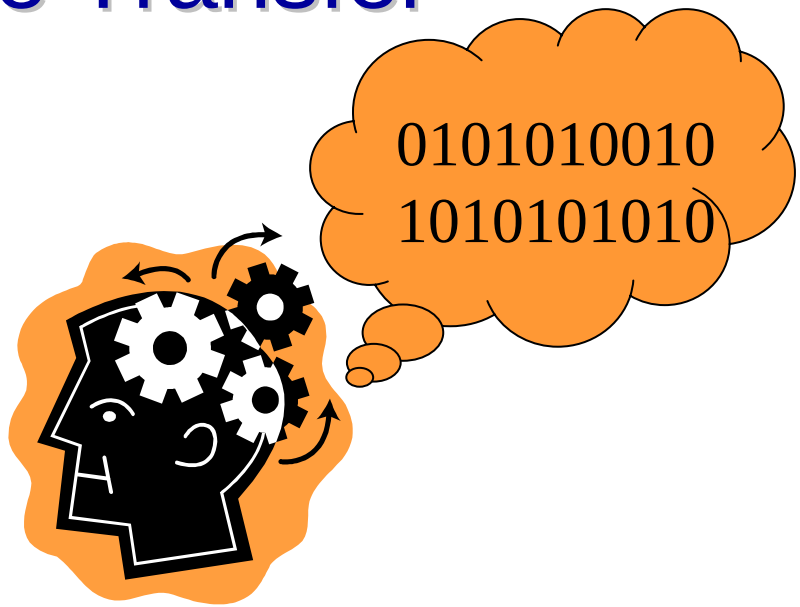
- *Information System Analysis:* The early steps in the systems development process, to define the requirements of the proposed system and determine its feasibility.

Analysis

- The quality of communication between the user and the developer group determines the quality of the information systems analysis, which determines the quality of the IT system.



Knowledge Transfer



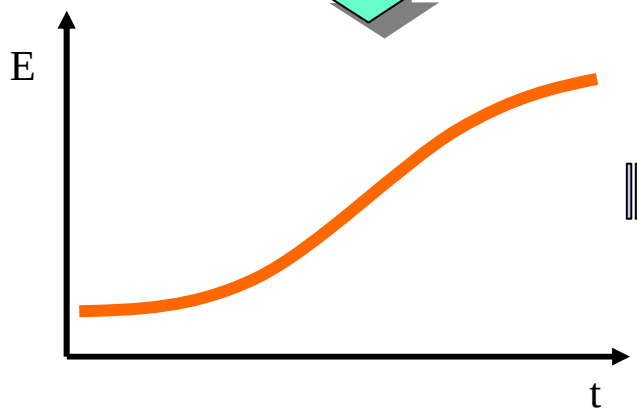
Depending upon one's mental model, the explicit knowledge provided by one party could be interpreted by another as intended or could be badly misinterpreted, as determined by the receiving party's tacit knowledge.

Knowledge Transfer

Developer Team:
- Tacit knowledge
- Explicit knowledge

Transfer of knowledge

User Team:
- Tacit knowledge
- Explicit knowledge



Effectiveness of Team

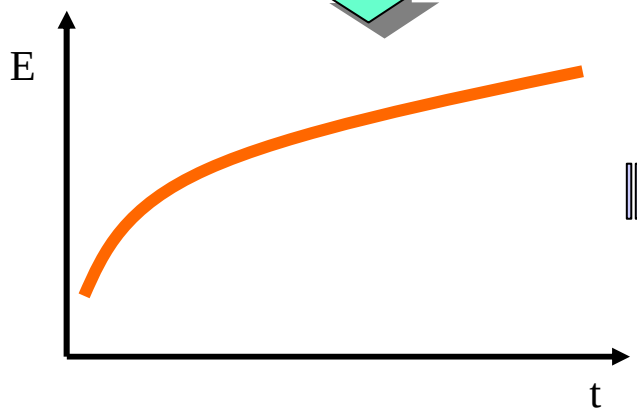
Quality of System:
- User satisfaction
- No cost overrun

Knowledge Transfer

Developer Team:
- Tacit knowledge
- Explicit knowledge

High tacit knowledge

User Team:
- Tacit knowledge
- Explicit knowledge



Effectiveness of Team

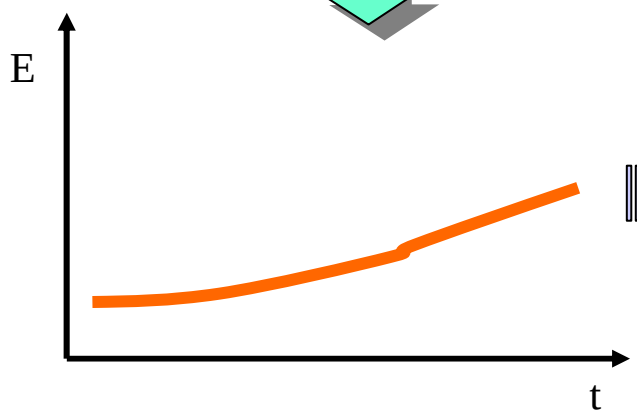
Quality of System:
- User satisfaction
- No cost overrun

Knowledge Transfer

Developer Team:
- Tacit knowledge
- Explicit knowledge

Low tacit knowledge

User Team:
- Tacit knowledge
- Explicit knowledge



Effectiveness of Team

Quality of System:
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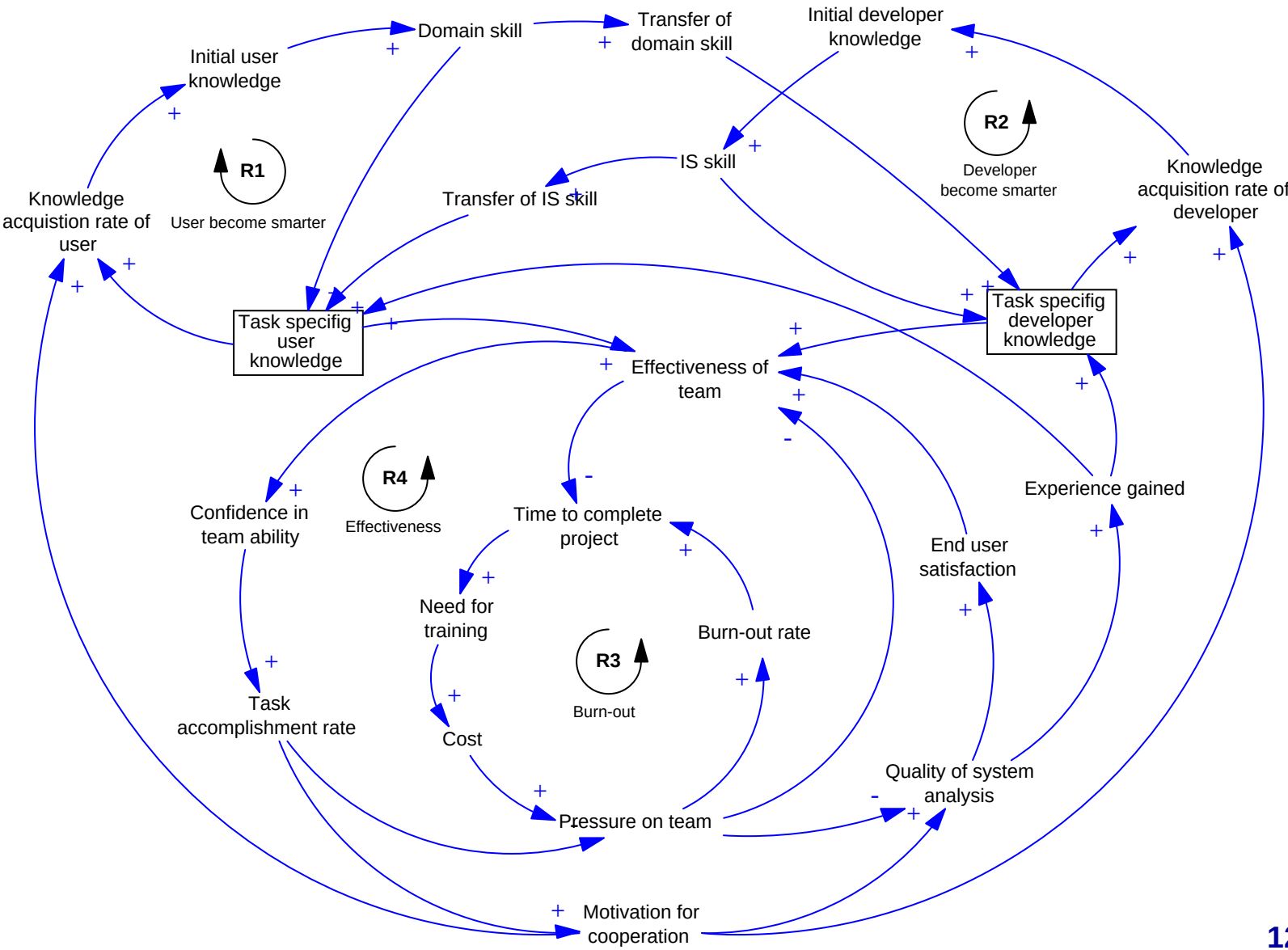
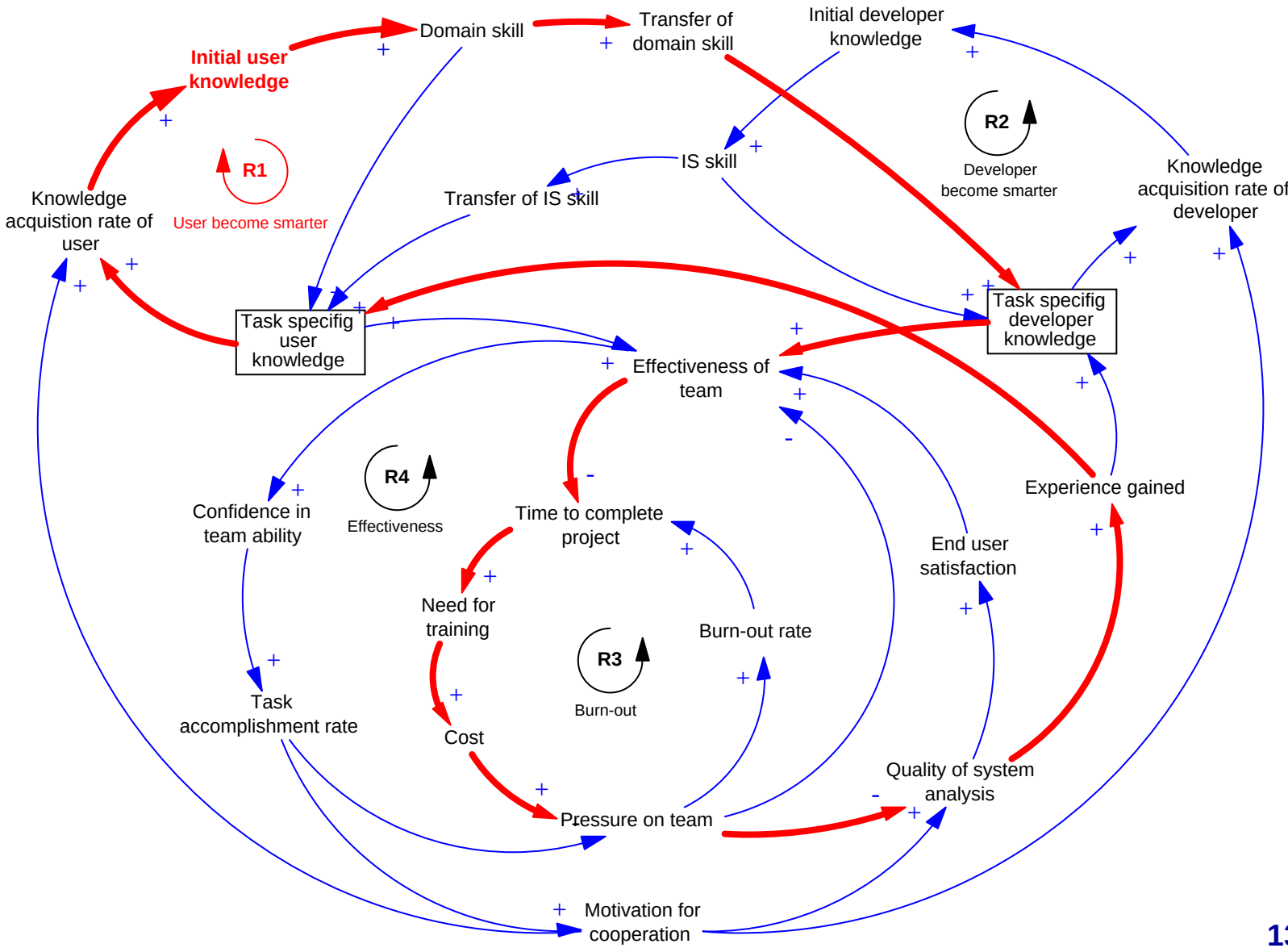
Theoretical Framework



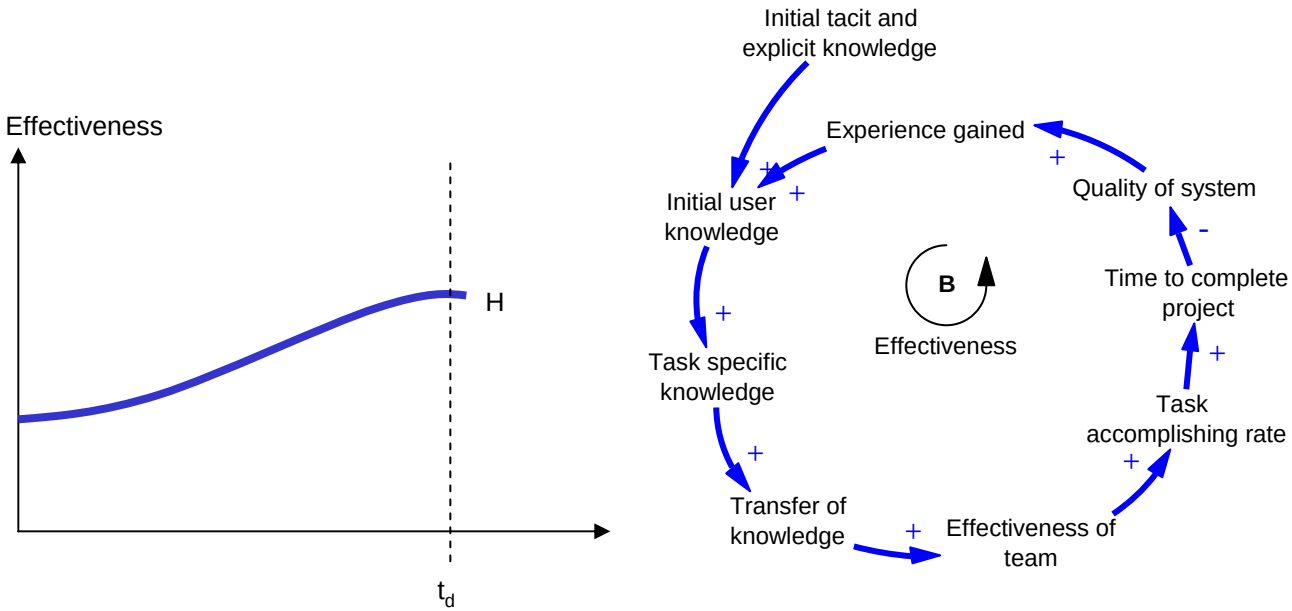
“Users Become Smarter” Loop



Dynamic Hypothesis

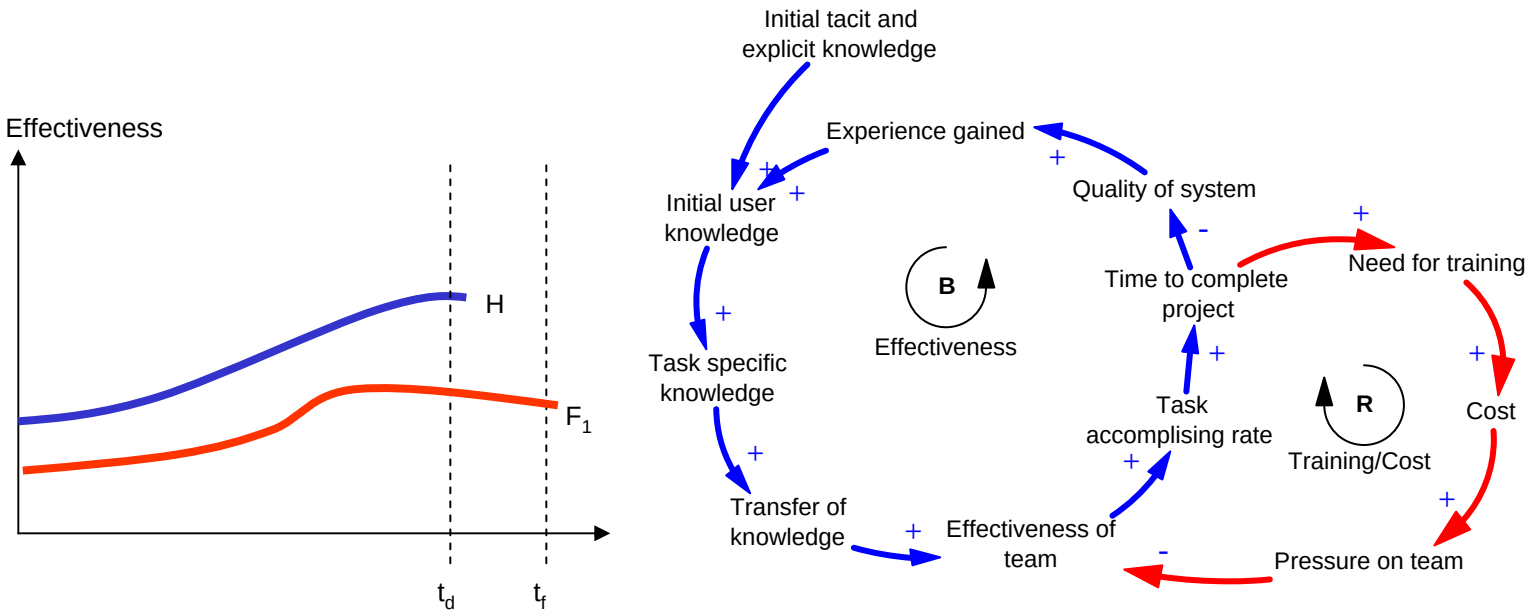
- The effectiveness of a system design team is related not only to the initial explicit knowledge that the team will bring to the project but also to the tacit knowledge possessed by the members of the team.

Dynamic Hypothesis cont.



Hope: System analysis team has the necessary level of tacit and explicit knowledge to finish the project (tasks) in the desired time (t_d).

Dynamic Hypothesis cont.



Hope: System analysis team has the necessary level of tacit and explicit knowledge to finish the project (tasks) in the desired time (t_d).

Fear (F_1): Initial low levels of tacit and explicit knowledge levels, causes low effectiveness

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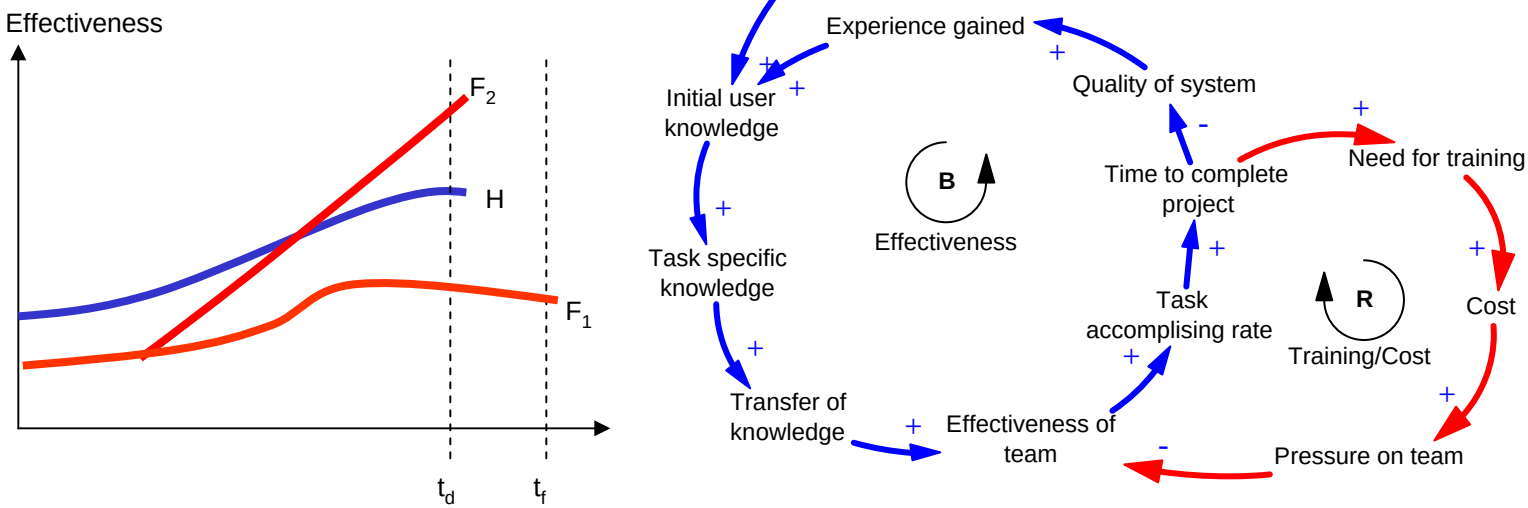
Dynamic Hypothesis cont.



Hope: System analysis team has the necessary level of tacit and explicit knowledge To finish the project (tasks) in the desired time (t_d).

Fear (F_1): Initial low levels of tacit and explicit knowledge levels, causes low effectiveness

Fear (F_2): Mid-term corrections, by either adding more skilled people to the team or by sending team through training.

Key Variables

- Initial tacit and explicit knowledge of developer and user (-> how can we measure the knowledge levels?)
- Interactions within team
- Task specific team knowledge
- Effectiveness of team

Bloom‘s Taxonomy

Measuring knowledge in the domain of IS Prototyping

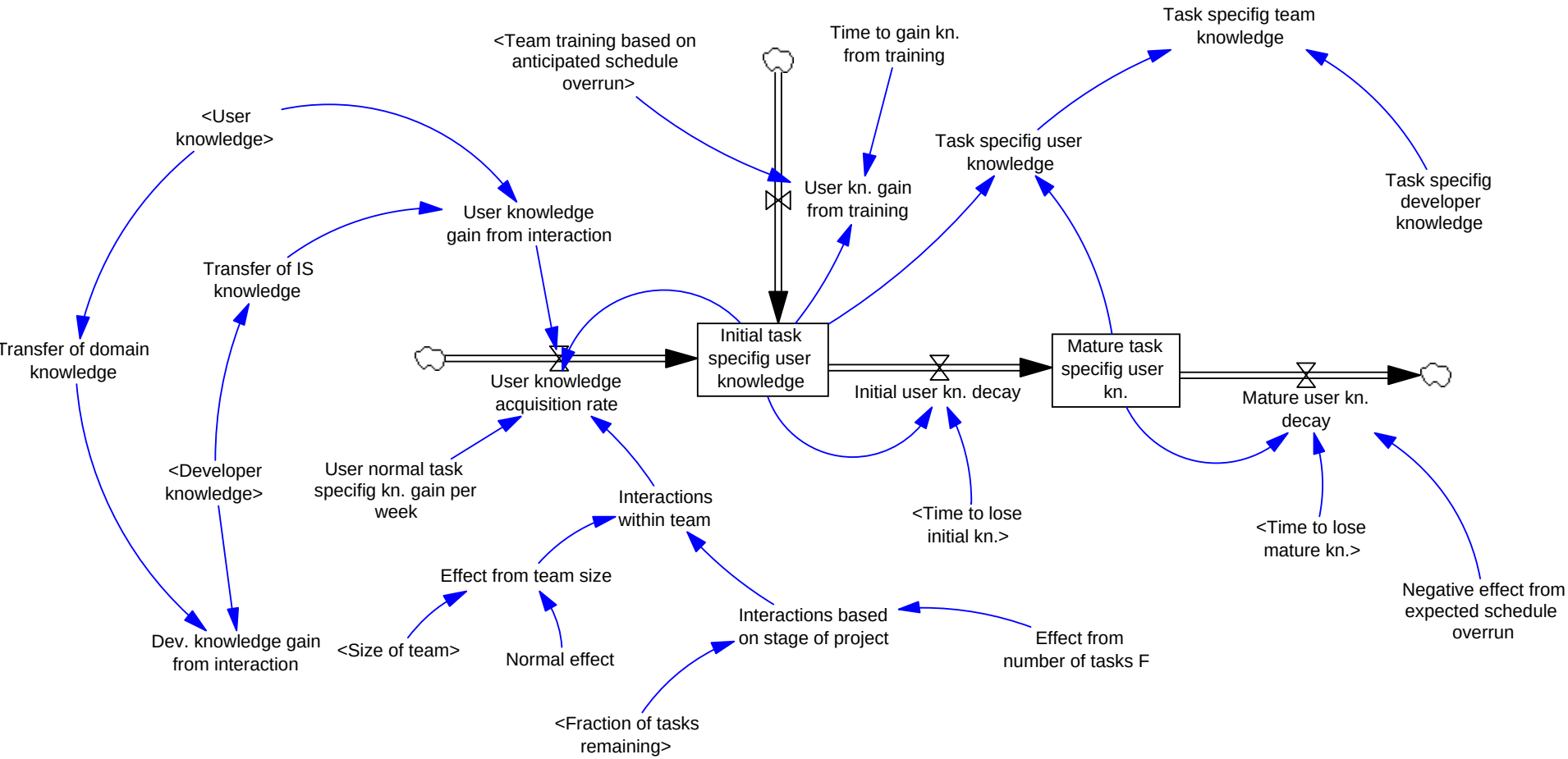
- ***Vocabulary:*** „I have heard the term before. Isn‘t that a method for developing an application in stages, where at each stage the user works with the application and suggests additional functionality“
- ***Comprehension:*** „Prototyping addresses the situation where users aren't‘t able to specify what they want a system to do. You give them a simple version with only a few features and they learn more about what they want by using the system.“
- ***Application:*** „Last semester I completed a system for a hospital that followed the prototyping approach. It took 12 versions, but the hospital administrator was pleased.“

Bloom‘s Taxonomy

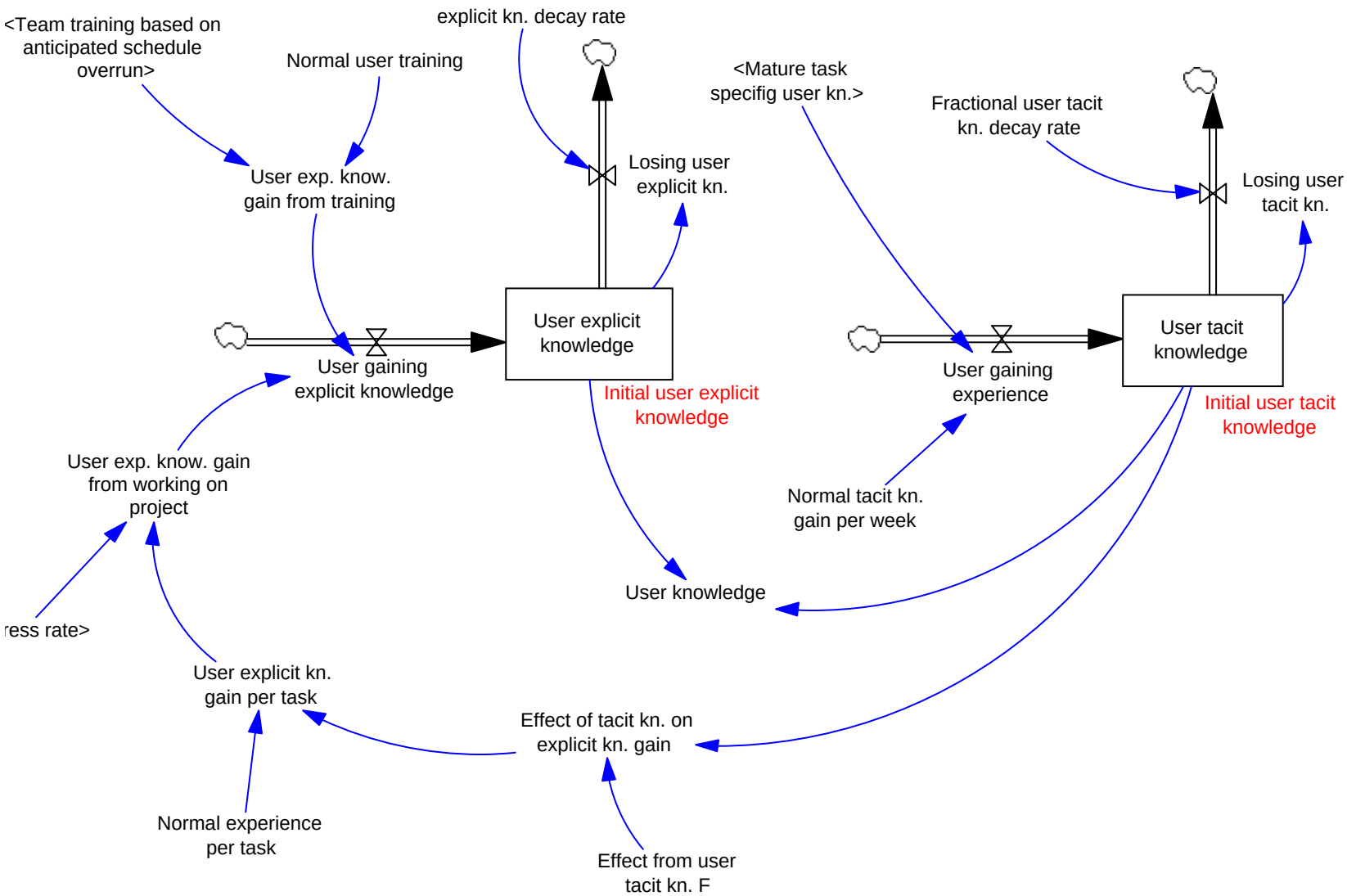
Measuring knowledge in the domain of IS Prototyping

- ***Analysis:*** „The learn by using method is really quite powerful. While it was originally intended as a learning devise for users, it also works as a learning tool for the developer. I have found that I learn as much about the functional area as the user learns about the system‘s functionality.“
- ***Synthesis:*** „I see a good application of prototyping in the design phase. By creating several system designs, in phases much like prototyping, we can cut design time and cost“.
- ***Evaluation:*** „I think we should measure the characteristics of the system to be developed and based on those characteristics decide which SDM to use.“

Model Structure



Model Structure



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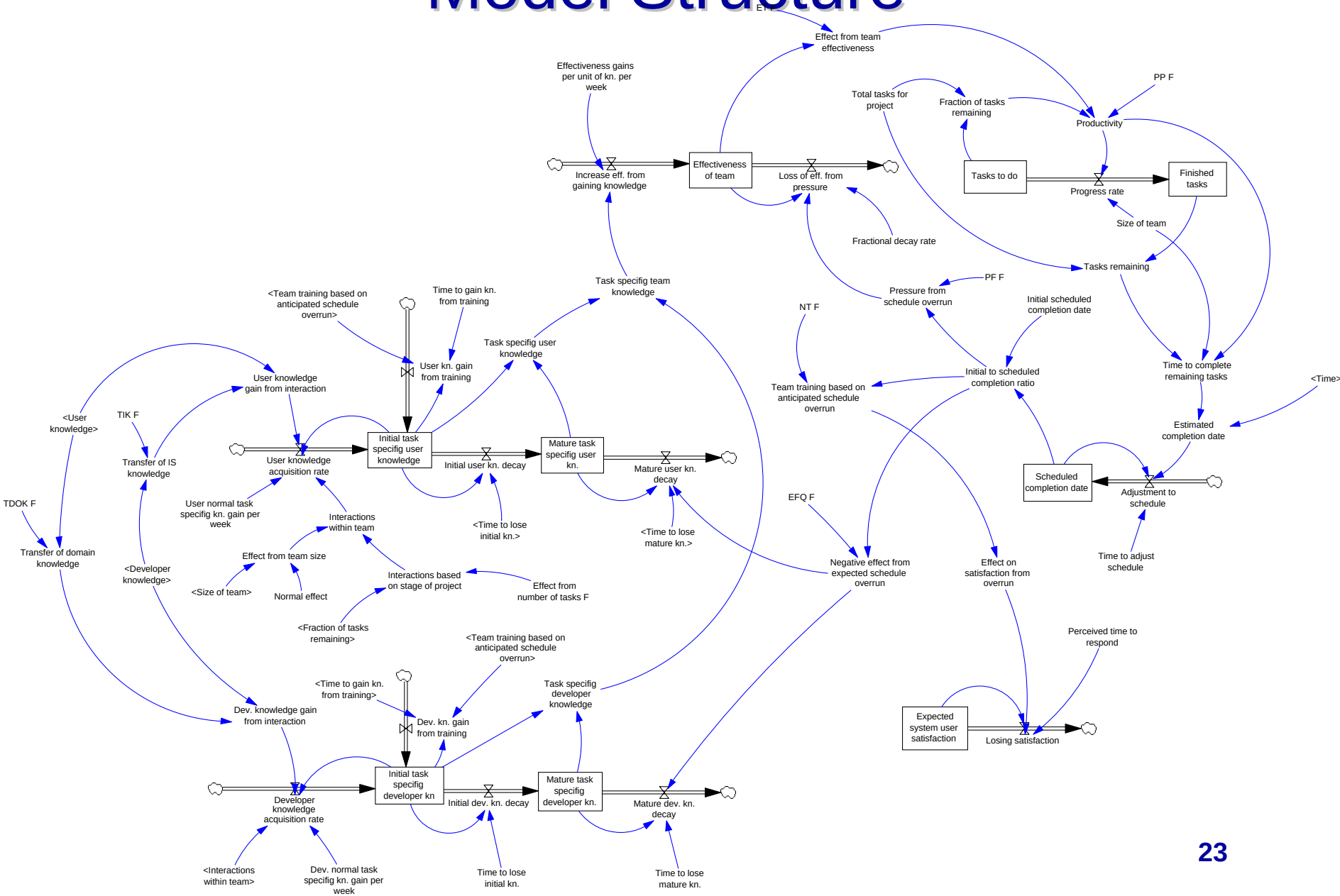
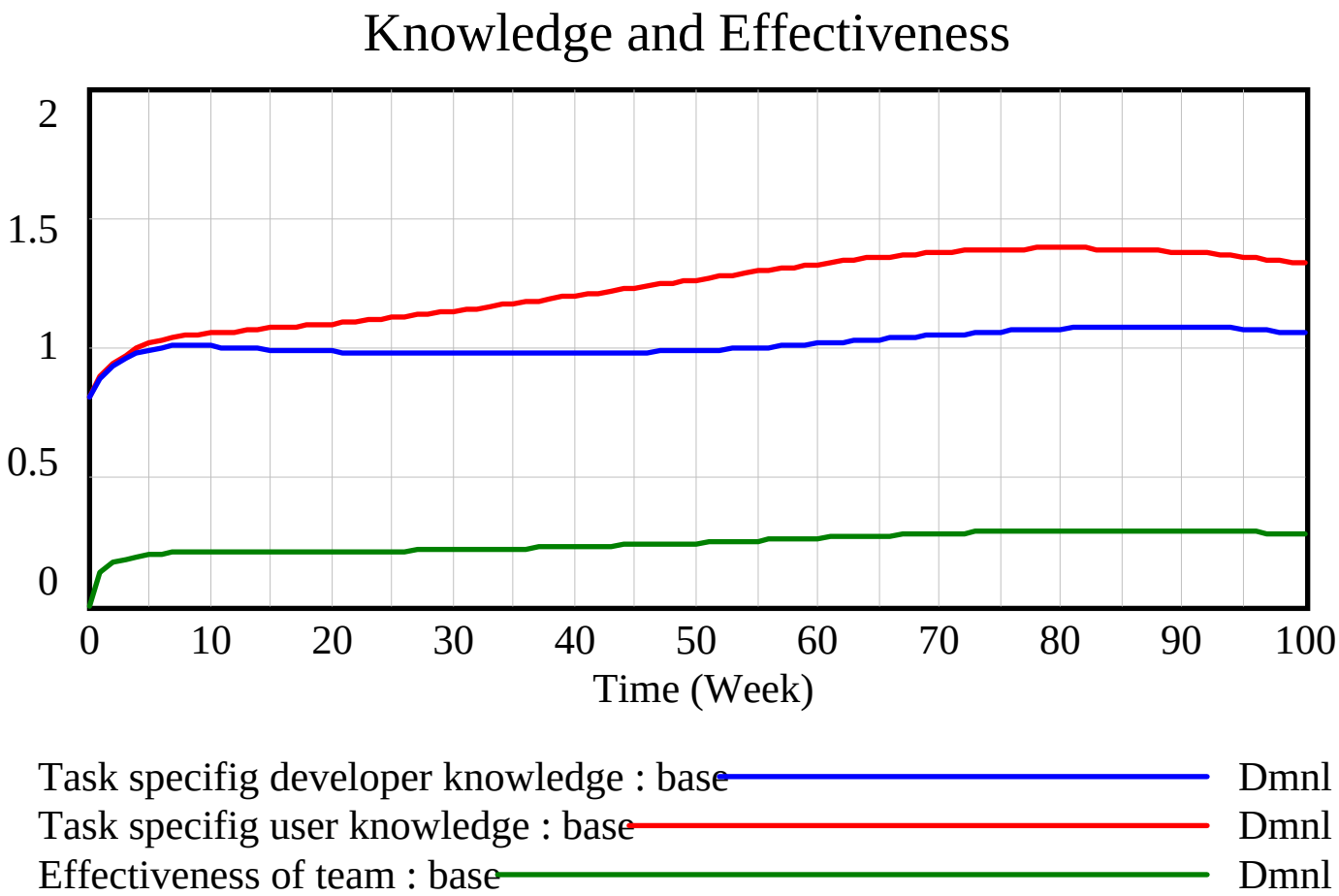
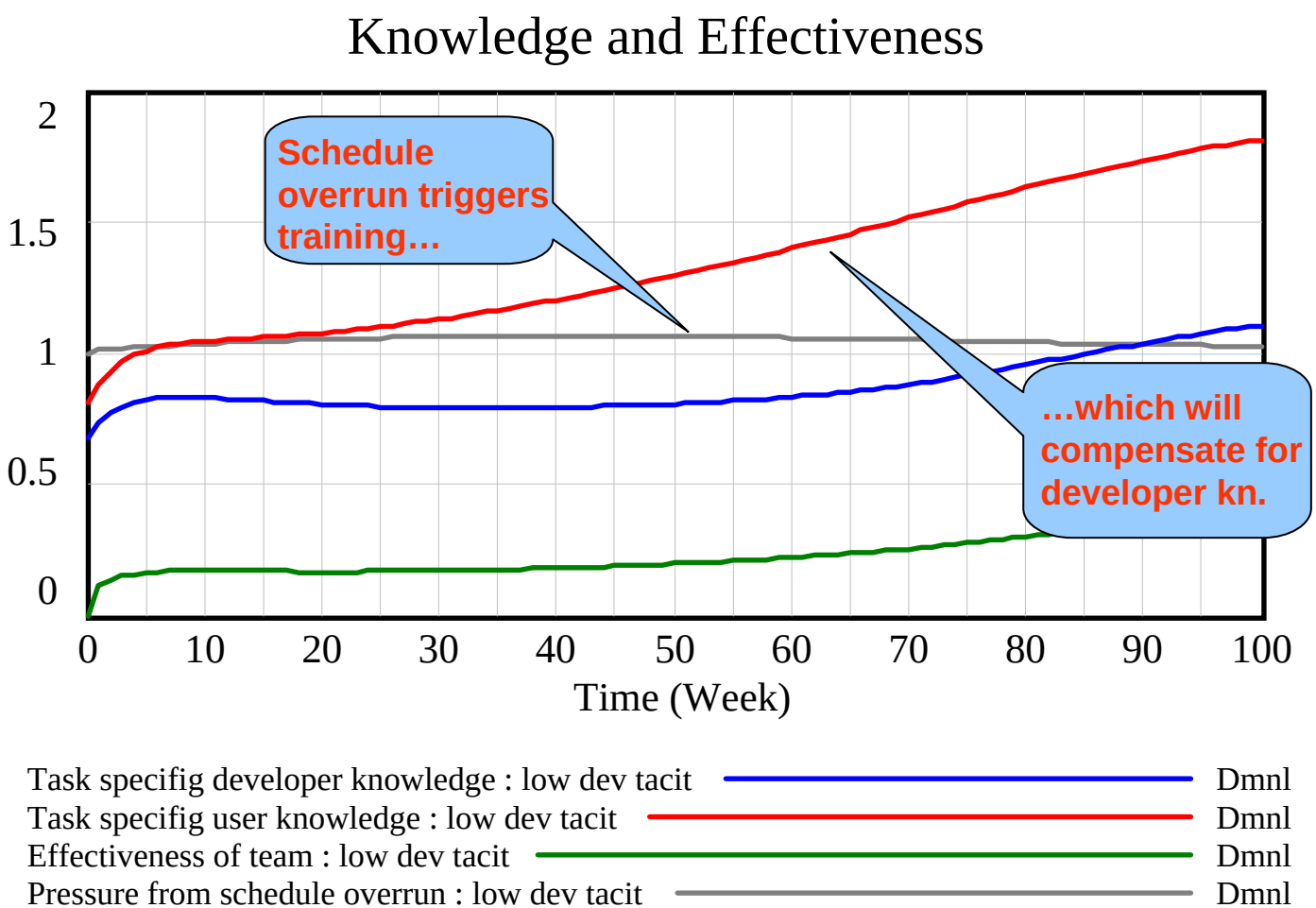


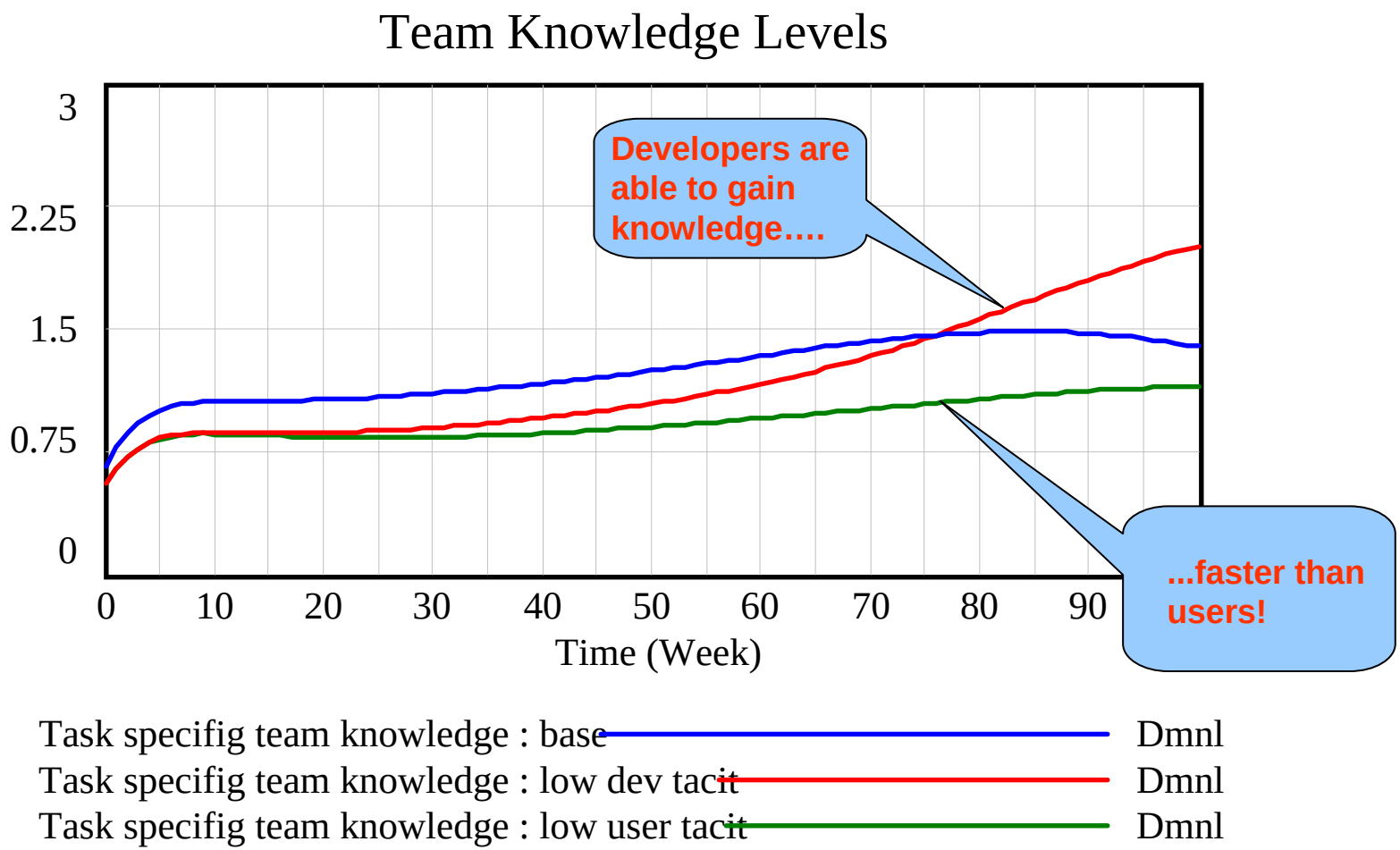
High Initial Knowledge Levels: Base Run



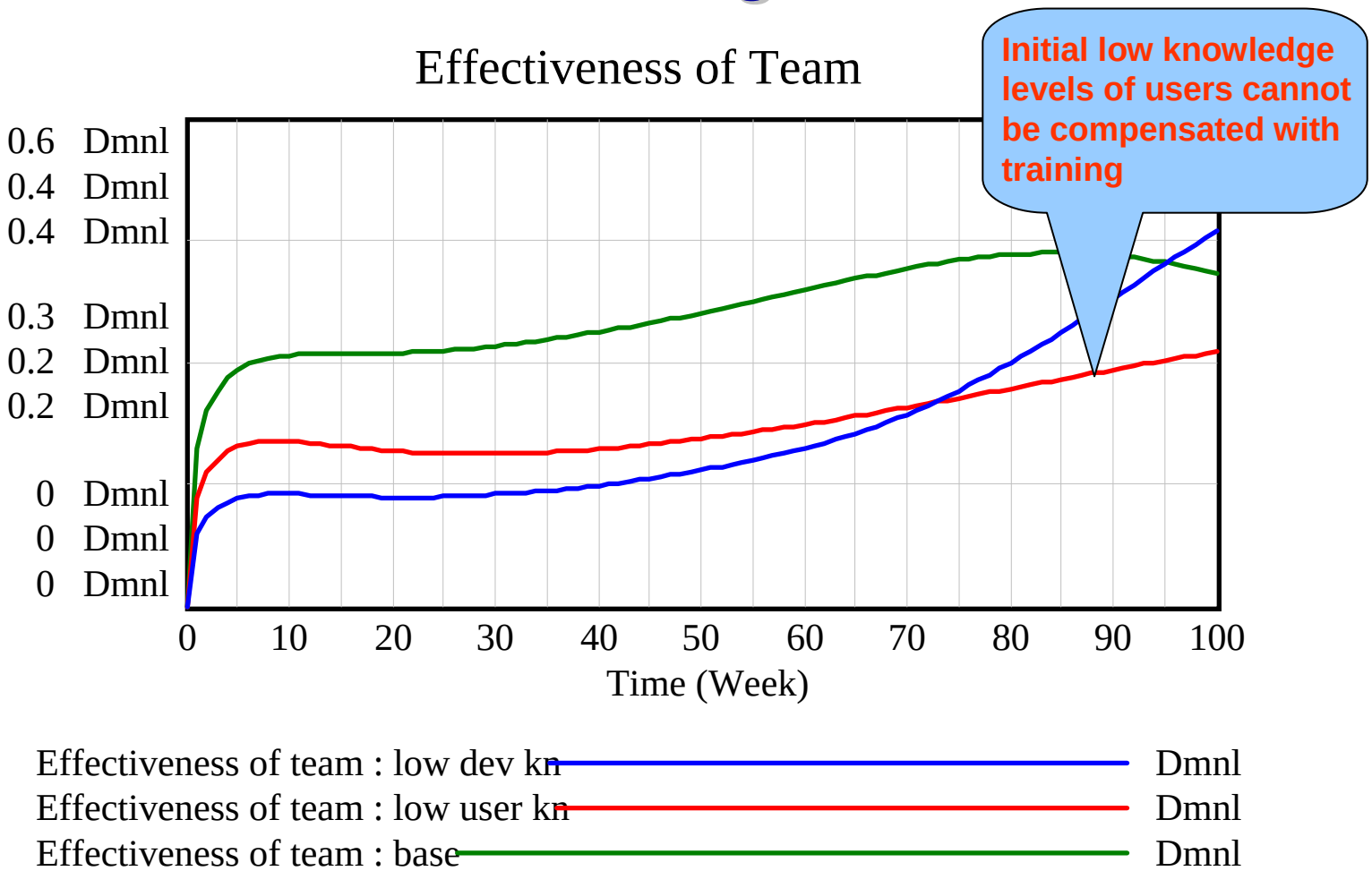
Low Levels of Developer Tacit Knowledge



Comparing the Effect from Low Tacit Knowledge



Low Levels of User versus Developer Knowledge

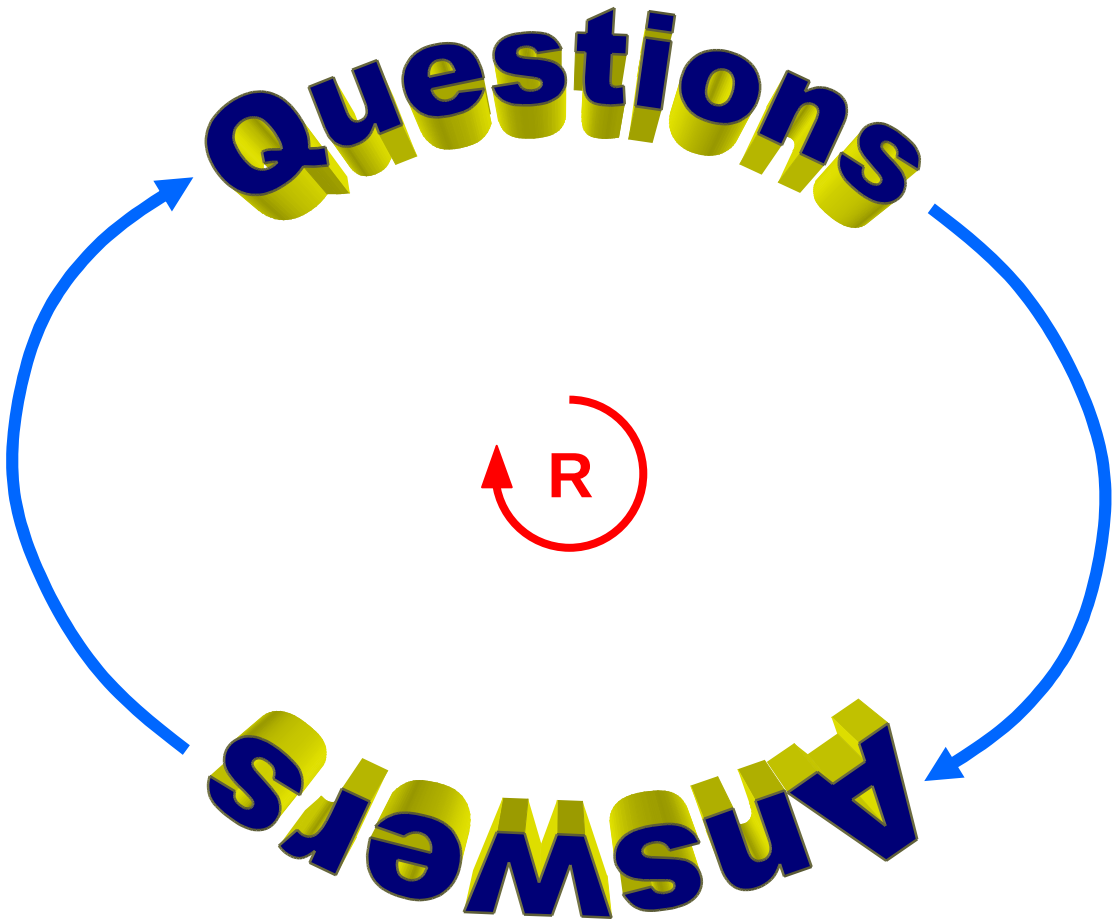


Insights from the Model

- To achieve an efficient knowledge transfer between the developer and user group, it is imperative to have a certain level of tacit knowledge on either side.
- The initial level of user knowledge determines the effectiveness of the team more than the knowledge level of the developer.

Critical Issues

- Because knowledge is an abstract concept, future research should investigate the parameter values that we have used in the model to better quantify the ideas and concepts in the proposed system dynamics model.


Questions
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Answers