Introducing Technology into the Workplace

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Abstract

Organizations in the knowledge business realize that their future depends on keeping their employees up to date on the latest technology. Some of us are trying to introduce new technology in our workplaces. Some efforts have been successful and some have not. The patterns described in this paper are the beginning of a pattern language for introducing new technology into the workplace. The contributors to this pattern language came from different organizations located all over the world. What they found when they examined their separate contributions was a close interrelationship between their experiences, which was reflected in the patterns they wrote.

Overview

Linda Rising and David DeLano led a workshop at OOPSLA '96, "Introducing Patterns Into the Workplace." Patterns were written by the following individuals, who represent companies across the globe. This workshop presented an opportunity for sharing our experience as patterns.

The following participants attended the workshop:

- David DeLano – AG Communication Systems, USA, delanod@agcs.com
- Dan Rawsthorne – BDM, USA, drawstho@bdm.com
- Linda Rising – AG Communication Systems, USA, risingl@agcs.com
- Clenio F. Salviano – Fundacao Centro Tecnologico para Informatica CTI, Brazil, clenio@ic.ct.br
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The original intent of the workshop was to develop a pattern language for introducing patterns into an organization. We found that introducing patterns was but one instance of introducing a new technology.

Common Forces

These patterns share some common forces:

- Management does not trust new technology since many promises made in the past have been broken.
- People are resistant to change.
- Change is necessary for an organization to survive.
- Working with new technology is exciting.
- New technology can introduce uncertainty.
- New technology often replaces people.

Other forces will be added to individual patterns, as they apply.

Patterns

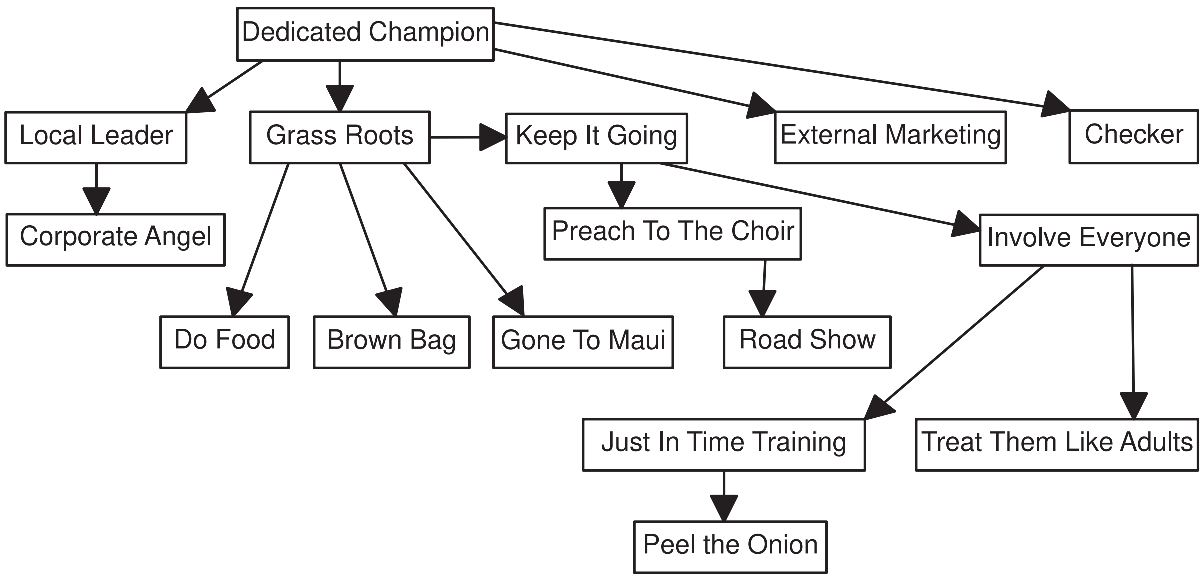
The patterns in the pattern language are listed as they appear in the paper. Patterns that apply specifically to introducing patterns into an organization are found in the appendix.

- Dedicated Champion
- Local Leader
- Corporate Angel
- Grass Roots
- Do Food
- Brown Bag
- Gone To Maui
- Keep It Going
- Preach To The Choir
- Road Show
- External Marketing
- Checker
- Involve Everyone
- Treat Them Like Adults
- Just In Time Training
- Peel the Onion

Appendix:

- Second Hand Source
- Related Concepts
- Less Disruptive Introduction

The patterns in a pattern language are always connected in some way. These patterns are related by context and resulting context. An arrow from one pattern to another implies the context of the second pattern contains the first and the resulting context of the first pattern contains the second. Introducing a new technology starts with Dedicated Champion. Once Dedicated Champion is applied, other patterns follow as specified in the resulting context: Local Leader, Grass Roots, External Marketing, Checker. The following diagram shows this relationship between the patterns in the language.



Dedicated Champion

Problem

Who leads the myriad of activities required for adopting a new technology?

Context

A software development organization that wants to stay abreast of new technology.

Solution

A dedicated champion must take up the cause of the new technology. Dedication means: (1) devotion to the cause and (2) having a job assignment of "championing" the new technology. This implies that the individual or small group with this role believes strongly in the importance of the new technology and can be empowered and self-directed to move the new technology across the organization.

A corporate angel may seek out a dedicated champion to implement the company's strategies but usually this pattern is more effective if it is the driver for the pattern language.

Resulting Context

A single individual or small group has responsibility for the continued growth of the technology and will find a Local Leader, perhaps a Corporate Angel, and begin to work with the Grass Roots. The dedicated champion may also do External Marketing or play the role of a Checker.

Rationale

Without the pro-active effort of a dedicated champion, new technology can wither and die on the vine. A single, motivated individual or small group brings a focus to the activities necessary to maintain a sufficient level of interest in the new technology to keep it alive.

This role is similar to Senge's leader, "those people who 'walk ahead,' people who are genuinely committed to deep change in themselves and in their organizations. They lead through developing new skills, capabilities, and understandings." [Senge96]

Known Uses

This pattern has been successfully applied at AG Communication Systems for patterns and other new technologies.

This pattern has also been used by the Fundacao Centro Tecnologico para Informatica CTI in Brazil. In a small organization, the corporate angel could also be the dedicated champion and may be involved with project implementation.

John McGehee at Texas Instruments had this role when his company was a client of Knowledge Systems Corporation.

Related Patterns

The Dedicated Champion may play the role of Coplien's Gatekeeper [Coplien95b].

Brad Appleton's I-SPI Patterns includes Dedicated Improvement Processors, a collection of champions who work as a group to effect process improvement. [Appleton97]

Author: Linda Rising

Local Leader

Problem

Who provides local support for adopting a new technology?

Context

A Dedicated Champion has taken up the cause of the new technology.

Solution

A local leader must support the new technology. This is a management role where the local leader is typically the coach of the Dedicated Champion.

Engaging a local leader may be difficult. Typically a dedicated champion will spark the interest in the new technology and must provide compelling evidence to draw in the local leader.

Resulting Context

The local leader keeps the focus on business results and is willing to commit resources to efforts that can show results and usually have more staying power than the followers of the latest buzzword.

The local leader must work with the dedicated champion to find a Corporate Angel.

The local leader can also provide resources needed to support Do Food or Gone To Maui.

Rationale

Senge notes, “we have seen no examples where significant progress has been made without [Local Leaders] and many examples where sincerely committed [Corporate Angels] have failed to generate any significant momentum.”

This role is described by Peter Senge: Local Leaders “are individuals with significant business responsibility and ‘bottom-line’ focus. They head organizational units that are large enough to be meaningful microcosms of the larger organization, and yet they have enough autonomy to be able to undertake meaningful change independent of the larger organization. [Senge96]

A similar observation has been made by Korson and Vaishnavi: “Site leadership is critical...experience suggests that where the technology will really make an impact across a broader spectrum, versus just a small project, is in those cases where [local] management...takes responsibility for committing the site to the technology... .” [Korson96]

Known Uses

This pattern has been successfully applied at AG Communication Systems. Two local leaders have supported the patterns activities and the work of the dedicated champion,

This pattern has also been used by the Fundacao Centro Tecnologico para Informatica CTI in Brazil. In a small organization, the corporate angel could also be the local leader and the dedicated champion and may also be involved with project implementation.

Related Patterns

The local leader may play the role of Coplien’s Fire Walls [Coplien95b].

Author: Linda Rising

Corporate Angel

Problem

Who sets organization-wide goals and determines high-level strategy for a new technology?

Context

A Dedicated Champion has taken up the cause of the new technology. A Local Leader may be supporting this effort.

Solution

The corporate angel is a high-level manager who has a special interest in the new technology. The corporate angel may seek out a dedicated champion to implement company’s strategy or a developer with a special interest may win the support of the corporate angel. The impact is more effective when a Dedicated Champion sparks corporate interest.

Resulting Context

The staff of the corporate angel will usually subscribe to the new technology, at least openly. If the technology shows itself to be worthwhile, all levels of management and developers will support the new technology on its own merit.

Rationale

For a new technology to be successful, high-level management support is required. Ideas need support at the top. No significant in-roads will be made without it. Even if all the developers subscribe to the new technology (unlikely in all but the smallest organizations), management support is essential for approval of tools, training, and other support activities.

When the corporate angel is especially enthusiastic and knowledgeable, the whole process of introducing new technology is eased.

To ensure the new technology has an impact across the organization, the efforts of the dedicated champion, the local leader, and the corporate angel must be aligned. When the interests at all levels are in harmony, the paradigm shift to the new technology can be made with minimal upheaval and disruption.

The role of corporate angel is not an authoritarian one. The upper-level management position should not be used to dictate behavior. Cultural change takes place slowly and should be built on grass roots effort.

As Peter Senge has noted, “Hierarchical authority, as it has been used traditionally in Western management, tends to evoke compliance, not foster commitment. The more strongly hierarchical power is wielded, the more compliance results. Yet there is no substitute for commitment in bringing about deep change. No one can force another person to learn if the learning involves deep changes in beliefs and attitudes and fundamental new ways of thinking and acting.” The role of corporate angel is similar to Senge’s executive leader, who is a protector, mentor, and thinking partner. [Senge96]

Known Uses

This pattern has been applied successfully to the introduction of patterns at AG Communication Systems. The corporate angel is the vice-president of product development, Charles Schulz. He has been a consistent supporter of all patterns activities. His influence has made it easier to bring in trainers and consultants, like Jim Coplien and Doug Schmidt, buy books, and attend conferences.

This pattern has also been used by the Fundacao Centro Tecnologico para Informatica CTI in Brazil. The corporate angel has a special interest in the new technology and has worked to develop one of the standards as well as setting organization-wide goals.

Related Patterns

Jim Coplien’s Patron [Coplien95b] describes the role of a high-level manager who supports a development project.

Author: Linda Rising

Grass Roots

Problem

How do you increase the likelihood that a new technology will be accepted by the technical community?

Context

A Dedicated Champion is in the initial stages of trying to introduce a new technology into an organization.

Solution

Find a group of people who have experience in the new technology or are very interested in it, and give them as much information and training as possible. They will provide a foothold for the new technology. At the very least, they will not get in the way of progress.

Resulting Context

A new technology is introduced from the bottom of the company up. People who may have been reluctant to learn the technology will support acceptance when their peers support it. There is a feeling of ownership of the new technology and the owners will work to see that the technology succeeds. It’s now up to the dedicated champion to Keep It Going.

Rationale

People don’t like to be told what to do. One of the worst ways to introduce a new technology is for it to be dictated by management. By stirring up interest from the bottom up, the receivers of the technology will push to get the technology implemented much more quickly.

If a Local Leader or Corporate Angel is not in place, the work of the grass roots can call attention to the new technology and result in management support.

Senge describes this group of people as being “able to move around the organization. They understand the informal networks, what researchers call the informal ‘communities of practice,’ whereby information and stories flow and innovative practices naturally diffuse within organizations.” [Senge96]

According to Senge, this group forms because of a predisposition. “All of them had something in their background – perhaps an especially influential college course, a particular work experience, or just a life-long interest – that predisposed them to..[a particular perspective]... . In turn, they felt attuned to others they met who shared this predisposition.” [Senge96]

Known Uses

A Dedicated Champion at AG Communication Systems used Grass Roots to get software developers to take an interest in learning about patterns.

This pattern has also been used by the Fundacao Centro Tecnologico para Informatica CTI in Brazil. The grass roots was involved in a pilot project to refine the new technology.

Brad Appleton’s I-SPI patterns collection describes an Improvement Action Team that is very close to Grass Roots. [Appleton96]

Related Patterns

Do Food and Brown Bag can be used to form the grass roots.

Author: David E. DeLano

Do Food

Aliases: Continental Breakfast will be Provided, Snack will be Provided

Problem

How do you get people to attend meetings introducing new technologies?

Context

A Dedicated Champion is trying to introduce a new technology to the Grass Roots. The target user community must be educated and “sold on” the new technology. Holding a meeting to introduce the new technology is an acceptable method. A Local Leader must be in place to provide resources.

Forces

- There is other, more important, work to be done.
- Developers have a natural curiosity about new technology and want to learn.
- Target users don’t know if they are interested in the new technology.

Solution

Have food at the meeting. Morning meetings call for donuts and bagels accompanied by coffee, tea, and juice. Afternoon meetings call for cookies and sodas (or the local equivalent). Meetings that fall in the middle of the day call for lunch. Always have iced water available no matter the meeting time, especially in Phoenix.

You may not be able to do food if the corporate culture doesn’t accept food in meetings. Some cultures don’t accept having meetings over lunch.

Resulting Context

Developers will attend almost any meeting if free food is available. Having the food to concentrate on when the meeting gets slow helps hold their attention (caffeine and sugar won’t hurt!).

Rationale

Everyone enjoys a free meal.

It is difficult to get developers to attend meetings when their presence is required. It is almost impossible to have good attendance at a meeting where something new is presented. These meetings are always considered optional and most developers won’t attend unless they have a vested interest in the information being presented. Developers with a vested interest can usually be counted on to take up the new technology without any extra incentive, but the rest of the community can be enticed to attend with the incentive of free food.

Known Uses

This technique has been used to draw attendance to information sessions set up to introduce patterns and other new technologies at AG Communication Systems.

Knowledge Systems Corporation had weekly technical staff meetings where participants shared what they were working on with their technical peers. These meetings raised awareness that was useful afterward. Lunch was provided.

Related Patterns

While the prospect of free food is nice, Brown Bag can be used when funding is not available.

Sketch

This graphic of chocolate chip cookies accompanied by an ice cold Pepsi has been left to the reader's imagination!

Author: David E. DeLano

Brown Bag

Problem

How do you get people to attend meetings where new technologies are introduced?

Context

A Dedicated Champion is trying to introduce a new technology to the Grass Roots. The target user community must be educated and "sold on" the new technology. Holding a meeting to introduce the new technology is an acceptable method.

Forces

- Meetings can be long.
- It is not always an option to Do Food.
- There is other, more important, work to be done.
- Everyone needs to eat.
- Target users don't know if they are interested in the new technology.

Solution

Hold a meeting in the middle of the day and invite participants to bring their own lunch.

You may not be able to have a Brown Bag if the corporate culture doesn't accept food in meetings. Some cultures don't accept having meetings over lunch.

Resulting Context

Developers are often willing to attend a meeting over lunch. This is not viewed as wasting time that could be spent doing "real" work, since the time would be spent eating anyway.

Rationale

Everyone has to eat lunch. If you are having difficulty finding a meeting time when people will attend, having the meeting over lunch will often find more people with available time.

It is better to Do Food for this meeting, but this would require support from management.

Known Uses

This technique has been used to increase attendance to meetings to introduce patterns and other new technologies at AG Communication Systems.

Knowledge Systems Corporation held discussion groups on patterns and other topics. Interested participants brought their lunch and took turns leading the discussion.

Author: David E. DeLano

Gone to Maui

Alias: Off-site Meeting

Problem

How do you get people to dedicate the time to work on a new technology?

Context

A Dedicated Champion is trying to introduce a new technology to the Grass Roots. The target user community must be educated and “sold on” the new technology. A Local Leader must be in place to provide resources.

Forces

- People are interested in the new technology but can’t get time to work on it.
- There is always other, more important, work to be done.

Solution

Arrange for a meeting off-site. All necessities, such as breaks and meals should be provided. Interruptions should be minimized by prohibiting pagers, phones and remote computer access. The meeting can be held all day, over a weekend, or over-night. Ideally, the meeting would be held at an appealing location, say a resort on Maui.

Resulting Context

An off-site meeting allows the participants to concentrate on the topic of the meeting. Interruptions are minimized.

There may be some resistance to having an off-site meeting. Since work time will be lost, anticipate the effort needed to catch up. Even if the meeting produces results that will save time or money in the long run, there will be an immediate need to counteract the perception of lost time.

Rationale

It is easier for busy people to make a commitment to a large block of time.

In our everyday work environment, we fight fires throughout the day. By moving to a neutral location, such distractions, including when to eat, are removed.

This pattern has the same appeal as Do Food in getting participants to commit to attending the meeting.

When such a meeting is arranged, the participants can let their colleagues know that they are “here today, but Gone to Maui!” [1]

Known Uses

AG Communication Systems has often held off-site meetings to focus on the resolution of important issues. We have not yet tried to make Maui the site of such a meeting.

This pattern has also been used for training, tutorials, conferences and workshops.

This pattern has also been used by the Fundacao Centro Tecnologico para Informatica CTI in Brazil. CTI is located in the city of Campinas. A partnering organization is located in the city of Curitiba. Meetings are held in one city or the other, which provides an off-site experience for the other group. The on-site group suffers all the disadvantages mentioned in this pattern and the off-site group gains all the benefits. As a result, a decision was made to have future meetings in a third city, to allow both groups to say they are Gone to Maui.

Knowledge Systems Corporation had several off-site corporate retreats to discuss “interaction” technology.

The Hillside Group was formed in a three-day off-site retreat since many were frustrated that progress wasn’t being made.

This is the premise of the Smalltalk Apprentice Programs supported by Knowledge Systems Corporation.

References

1. In a Warner Brothers’ movie, Bugs Bunny quips, “...hare today, gone to Maui,” a take-off on the old saying, “Here today, gone tomorrow!”

Author: David E. DeLano

Keep It Going

Problem

How can the interest in a new technology be sustained in an organization?

Context

A Dedicated Champion is trying to introduce a new technology to the Grass Roots.

Solution

To ensure that a new technology takes root and thrives, the dedicated champion and other supporters of the new technology, including the grass roots, must be pro-active in their efforts. They must constantly:

- Be aware of outside events and call them to the attention to the rest of the organization.
- Read the literature and send along important information to appropriate people.
- Attend conferences.
- Network with others interested in the technology and share successes/failures.
- Bring in outside experts, trainers, and consultants.

Do Food, Brown Bag, and Gone to Maui can be used to keep it going.

Resulting Context

The members of the organization have a sense of keeping up with the latest and greatest, even when they are too busy to take advantage of all of the items offered.

Rationale

Without pro-active efforts, new technology can wither and die on the vine. It takes work to maintain interest in a new technology. It will not just survive unassisted.

Known Uses

This pattern has been successfully applied at AG Communication Systems for patterns activities and other new technologies.

This pattern has also been used by the Fundacao Centro Tecnologico para Informatica CTI in Brazil.

Author: Linda Rising

Preach to the Choir

Problem

How do you gain confidence in introducing a new technology?

Context

A Dedicated Champion is working to gain support for a new technology from the Grass Roots, trying to Keep It Going.

Forces

- It is difficult to present information on new technologies.
- To leverage a new technology, information must be presented to newcomers.

Solution

Present information and training to the Grass Roots.

Resulting Context

Since the grass roots believes in the new technology, they become the choir and will listen and provide valuable feedback on the material being presented. This will help the presenter develop solid presentations and gain confidence in presenting the information. The next step is a Road Show.

Rationale

Some people will already be interested in the new technology and want more information; these people are the Grass Roots. Use this core group of interested people to improve presentations.

No one likes to make a presentation to a hostile or apathetic audience. It is far better to gain experience by presenting to interested audiences.

When you Preach to the Choir, it is possible that a false sense of security is attained. Use this pattern while the introduction of the technology is in its infancy. There should always be a goal of presenting a Road Show.

Known Uses

We often Preach to the Choir in the initial stages of introducing new technologies at AG Communication Systems.

This pattern has also been used by the Fundacao Centro Tecnologico para Informatica CTI in Brazil. In addition to presenting information and training to the Grass Roots, they are involved in exercises to evaluate components of the new technology.

Author: David E. DeLano

Road Show

Problem

How can you validate the presentation of a new technology to an organization?

Context

The new technology is catching on at the Grass Roots. A Dedicated Caption is trying to Keep It Going and has had opportunities to Preach to the Choir.

Solution

Take the information learned as you Preach to the Choir to develop presentations for informing and training newcomers. Make presentations to audiences that are totally unfamiliar with the technology, even outside the company.

Resulting Context

A successful Road Show will validate the presentation. An unsuccessful Road Show helps improve the material or helps you realize that the new technology is invalid, at least for the target audience.

You are much more likely to meet a hostile or apathetic audience during a Road Show, but you have already gained confidence in the material. From the Road Show you will gain new supporters for the new technology and you will learn how to better tailor your presentations to make them more palatable.

Rationale

Legend has it that “Will it play in Peoria?” was often asked of new vaudeville acts. It seemed that Peoria had a reputation as a city that demanded a lot from the performers, and if the act succeeded there, it would succeed anywhere. Peoria was not the place to introduce the acts, but it was a Road Show location where the acts proved their worth.

Known Uses

The champions of several new technologies, including patterns and use cases, have given Road Shows both inside and outside of AG Communication Systems.

This pattern has also been used by the Fundacao Centro Tecnologico para Informatica CTI in Brazil. Courses were given to help students learn the new concepts and also to allow the presenters to gain confidence in the methodology. After this experience, other presentations were given outside the company.

Author: David E. DeLano

External Marketing for Internal Customers

Alias: Send it out

Problem

How can a Dedicated Champion promote new technology in a development organization?

Context

In a large organization, there may be several Dedicated Champions with great ideas and helpful information for developers in other parts of the organization. The Dedicated Champions are allowed to publish externally, after proprietary information has been removed.

Solution

Send the ideas outside to get them back into the organization again in an external publication.

Be sure your publications are accurate or the pattern will lead to loss of credibility.

Publish in journals read by your internal customers. Present your work at conferences attended by your internal customers. A final, but expensive option, is to write a book and get it published by an external publisher.

A variant to external publication is the use of external consultants to bring back your ideas to your development team.

Resulting Context

Your internal customers will learn about your work through trusted channels. Development projects might invite you for in-house presentations, workshops, consulting, etc. This might result in the application of other patterns in this collection such as Grass Roots or Checker.

If a Local Leader or Corporate Angel is not in place, a good external publication might bring management sponsorship.

Rationale

”A prophet is without honor in his own country.” Reputation is difficult to establish and easy to lose.

External publications have more credibility than internal technical reports. Internal technical reports are often WODs (write-only documents), sometimes distributed widely at a management level without giving developers exposure to the ideas.

Known Uses

Siemens Corporate Research and Development (ZFE). Technologies transferred this way include: distributed object computing (CORBA etc.), patterns, object-orientation, and Java.

Frank Buschmann, Regine Meunier, Hans Rohnert, Peter Sommerlad, and Michael Stal, Pattern-Oriented Software Architecture – A System of Patterns, John Wiley & Sons, 1996.

Junichi Yamamoto's manager at Toshiba wrote a book on OO design that was read by Toshiba developers. Since the book was written in Japanese, it had a wider audience than the Design Patterns text. [Gamma95]

This pattern has also been used by the Fundacao Centro Tecnologico para Informatica CTI in Brazil. A paper was submitted to a local conference and was ranked first place among those submitted. When the Corporate Angel learned about this honor and spread the word, this gave the concept credibility.

Author: Peter Sommerlad

Checker

Problem

How do you avoid incorrect use of new technologies?

Context

A Dedicated Champion has taken up the cause of a new technology. The project targeted for introduction of the new technology includes members who are unfamiliar with the new technology and may make mistakes in its application.

Forces

- Members of the project can study the new technology by themselves to some extent.
- The technology may be difficult to understand.
- There may not be time to learn the technology.

Solution

Hire a checker who knows the new technology well. Project members will apply the new technology, the Checker will detect incorrect use of the technology, and inform the project members.

Resulting Context

Project members will become aware of any incorrect use of the new technology in a timely manner, so they can act on it as soon as possible.

Rationale

If the project members are willing to introduce a new technology into their project, they can study the technology to some extent. However, they tend to apply the technology imperfectly since they are not necessarily experts in the technology.

The number of experts in the technology may be relatively small compared with the number of projects. The experts do not always know about the domain on which the software is being developed. This pattern does not require the Checker to be an expert of the domain. A single Checker can be used on several projects at the same time.

Known Uses

This pattern has been applied to the introduction of design patterns into a software development project at Toshiba Corporation. In this development, the Checker was also a member of the development project. The Checker detected incorrect usage of patterns during the design phase.

Toshiba Corporation is also planning to develop a CASE tool which behaves as a Checker for design patterns. The CASE tool will be able to detect some kinds of incorrect usage of design pattens.

Author: Junichi Yamamoto

Involve Everyone

Problem

What is the most effective way to spread the benefits of a new technology across an organization?

Context

A Dedicated Champion is working with the Grass Roots to introduce new technology and Keep It Going. A Local Leader and Corporate Angel are in place.

Solution

Let everyone feel a part of the new technology. Build enthusiasm, pointing out specific benefits, particularly those of interest to each individual. [Webster95]

Involve everyone from as many different groups as possible. This includes everyone in the company: coaches, developers, testers, support people, marketing, training.

Get the developers involved so they feel their comments and efforts are useful and that they have an investment in the new technology. [Webster95]

Avenues should be open to allow each individual as much information as s/he can process and as many opportunities as s/he can pursue.

Create a cult of learning. The best people thrive in this kind of environment. [Webster95]

Resulting Context

The entire organization feels a part of something new and exciting and will be open and supportive of the new technology.

Other patterns in this collection will be appropriate, e.g., Treat Them Like Adults, and Just In Time Training.

Rationale

Most people are too busy to keep up with all the latest trends but are usually interested if someone will make learning easy for them. When people feel a part of something new, they are more excited about it and open to trying applications of the new technology.

Known Uses

This pattern has been successfully applied at AG Communication Systems.

This pattern has also been used by the Fundacao Centro Tecnologico para Informatica CTI in Brazil. Presentations have been given to the entire company. The feedback from these presentations has allowed everyone to increase their involvement in the new technology.

Brad Appleton's I-SPI patterns collection describes a Virtual Forum to involve everyone. [Appleton96]

Related Patterns

Do Food and Brown Bag can be used to Involve Everyone.

Author: Linda Rising

Treat Them Like Adults

Problem

How can managers help people stay motivated while learning new technologies?

Context

There is a need to introduce a new technology while developing a system, so developers must assimilate a new technology in a working, rather than training, environment.

Forces

- People have established ways of doing things.
- People like to learn.
- People hate to fail.
- Developers are very independent.
- There is a fine line between abandonment and granting independence.

Solution

Managers should tell developers what will be expected of them, provide Just In Time Training, and let them perform. Do not micro-manage them, but monitor their performance. Show that you trust them and you are not abandoning them. Let them know that you do not expect the same level of performance with the new technology and you appreciate that they are learning as they produce.

Resulting Context

Developers will learn new technologies while producing a product. They will be proud of themselves and appreciate the way their management treated them.

Rationale

Software developers have large egos, and see themselves as artistic and highly individualistic. They tend to rebel against being led by the hand, and see this as inappropriate, paternalistic, behavior. On the other hand, developers want appropriate training, so they don't feel like they are "hanging out there." The key is the word "appropriate." They must see a use for it while they are being trained. By providing Just In Time Training, assigning responsibility, and giving independence, management allows developers the ability to discover the stumbling blocks themselves. If additional support is available, this works well, and allows the developer to "burn in" the training through use, while producing something.

Known Uses

This is a well-known principle, advocated by many management philosophers. It is the philosophy behind most On the Job Training (OJT) programs.

This pattern has also been used by the Fundacao Centro Tecnologico para Informatica CTI in Brazil.

Author: Dan Rawsthorne

Just In Time Training

Problem

How should we train people in new technologies?

Forces

- Introducing new technologies into the workplace requires training.
- Training is easily forgotten if not used.
- Managers don't like to plan their training in as much detail as they plan operations.

Solution

Divide the training curriculum into small, manageable, chunks. After each chunk is taught, provide an opportunity to use what was learned. Peel the Onion to provide this training.

Resulting Context

Developers are not frustrated about learning something they are not using. Training is more effective, as the lessons learned are internalized before they are forgotten.

Rationale

It is easier for developers to take training seriously if they know that what they are learning will be used very soon. This approach requires management to have a serious approach to training – it must be much more than just training for training's sake. It requires communication between management and developers to make this system work.

Known Uses

Many 1-hour training courses at BDM introducing OO technologies.

This pattern has also been used by the Fundacao Centro Tecnologico para Informatica CTI in Brazil.

Author: Dan Rawsthorne

Peel the Onion

Alias: From Abstract to Concrete

Problem

How can complex technologies be introduced in a working environment?

Context

We need to introduce a new technology into a working environment.

Forces

- There is a need to "get on with things".
- People develop bad habits when they don't really understand something.
- People like examples.
- There is a tension between having skills and having comprehension.
- To introduce a new technology into the workplace, developers must acquire the ability to work with it.

Solution

Introduce new technology starting with abstract principles and progress to concrete implementations. Provide a Running Example [Meszaros96], introducing it a little at a time to illustrate the appropriate level of detail.

Resulting Context

New technology will be integrated into the organization. Developers will understand the important portions of the technologies, and how the abstract and concrete portions tie together.

Rationale

Developers that are taught skills out of context tend to have one of two reactions. The most common reaction is that they do what they are taught without fully understanding the context, thus causing mistakes. Another reaction is to avoid using the new technology rather than use it incorrectly. In either case, the problems could have been avoided by teaching the context before teaching the techniques.

Assume we have a group of C programmers we wish to turn into OO developers using C++. The worst thing one can do is teach these developers C++ immediately. What you will wind up with is C++ programmers, not OO developers. First teach OO analytic concepts, then OO design concepts, and finally C++. In this way you can focus on the issues that arise from the study of the abstract. Not only does the developer know what is important about C++, but what is not important as well.

Known Uses

This management philosophy has been used at two BDM offices when introducing OO technology.

It is a well-known teaching technique in the US Army.

Author: Dan Rawsthorne

Appendix

Less Disruptive Introduction

Problem

How can patterns be introduced into an organization?

Context

Developers in the organization already have a way to work. There are some problems, but overall the current approach is working well. There is a Dedicated Champion for patterns.

Solution

Use a less disruptive introduction strategy to introduce patterns. Choose a phase of a project where it will not require major changes in the way the other parts of the project are done. Be sure the use of patterns is appropriate for this phase. Motivate people working in that phase of the project to use patterns there.

Use Second Hand Source to implement this pattern.

Resulting Context

An environment where the new technology adapts gradually to the culture of the organization and vice-versa. Patterns are used only where it is appropriate.

Rationale

People will be more willing to try the new technology, because they do not need to commit to patterns for a whole project. After getting good results, patterns can be used in other projects.

Patterns are not a good technology for everything. There is no silver bullet. A less disruptive introduction strategy helps determine where patterns should be used.

A typical approach to introduce new technologies is to choose a pilot project as an experiment. Sometimes, however, this is not possible, for example, because of lack of resources.

Known Uses

This pattern has been used by the Fundacao Centro Tecnologico para Informatica CTI in Brazil.

Related Patterns

This pattern fits in the category “without an asterisk” proposed by Alexander [Alexander79]. It is not a true invariant. Rather, it represents one way of solving a problem. It is not driven by extensive experience but represents insights written in a pattern form.

Author: Clenio F. Salviano

Second Hand Source

Problem

How can established practice be documented using patterns?

Context

A Less Disruptive Introduction is the core of our strategy to introduce patterns in the organization. A set of good practices for software technology has been established in the organization that is not expressed in pattern format.

Solution

Review the set of established good practices, select elements that are appropriate, and document them as a pattern. Use checklists to guide this process, available in the pattern literature [Beck94, Coplien96a].

Resulting Context

A new “patterns” perspective on established practices.

Rationale

A pattern should come from direct experience.

There are models, e.g. CMM and SPICE, for software process that describe what is believed to be best practices for software. From a patterns perspective, they are based on inappropriate assumptions, but they do contain elements of software best practices. Patterns can be mined from them. Second Hand Source can help bridge these approaches.

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Related Concepts

Problem

How do you communicate the notion of patterns?

Context

We want to make people comfortable to ensure their understanding of a new technology.

Forces

- People filter reality using their own paradigm. “For a person with a hammer, everything looks like a nail.”
- New concepts change current belief.

Solution

Relate a concept from the person’s background to patterns.

Clearly explain the similarities and the differences between the concepts. There are three ways to do this: find the concept and present it to the person, find it with the person, or let the person find the concept.

Resulting Context

The person has a connection from an accepted idea to the new concept. The understanding is better.

Rationale

It is always good practice to use a person’s background to communicate new concepts.

This approach shows the person that patterns is not a completely new concept that requires abandoning current beliefs.

To explain patterns to a person with a philosophy background, we gave him two papers by James Coplien [Coplien94, Coplien95a]. After reading them, he related patterns to Plato’s idea of movement. The person understood patterns as a trigger to generate a movement that causes an action.

For a person who has studied Peter Senge's approach for learning organizations [Senge90], we used the relationship between patterns and the structural explanation of complex situations. Both focus on the structures that cause the patterns of behavior. This relationship has been described by James Coplien [Coplien96b].

Known Uses

This pattern has also been used by the Fundacao Centro Tecnologico para Informatica CTI in Brazil. The new technology related all new terms and methodology to the existing approach. The plan is that the new approach will ultimately absorb the old one.

Brad Appleton's I-SPI patterns collection describes a pattern called Make It Real that shares the intent of Related Concepts. [Appleton97]

Author: Clenio F. Salviano

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