Features, scenarios and stories
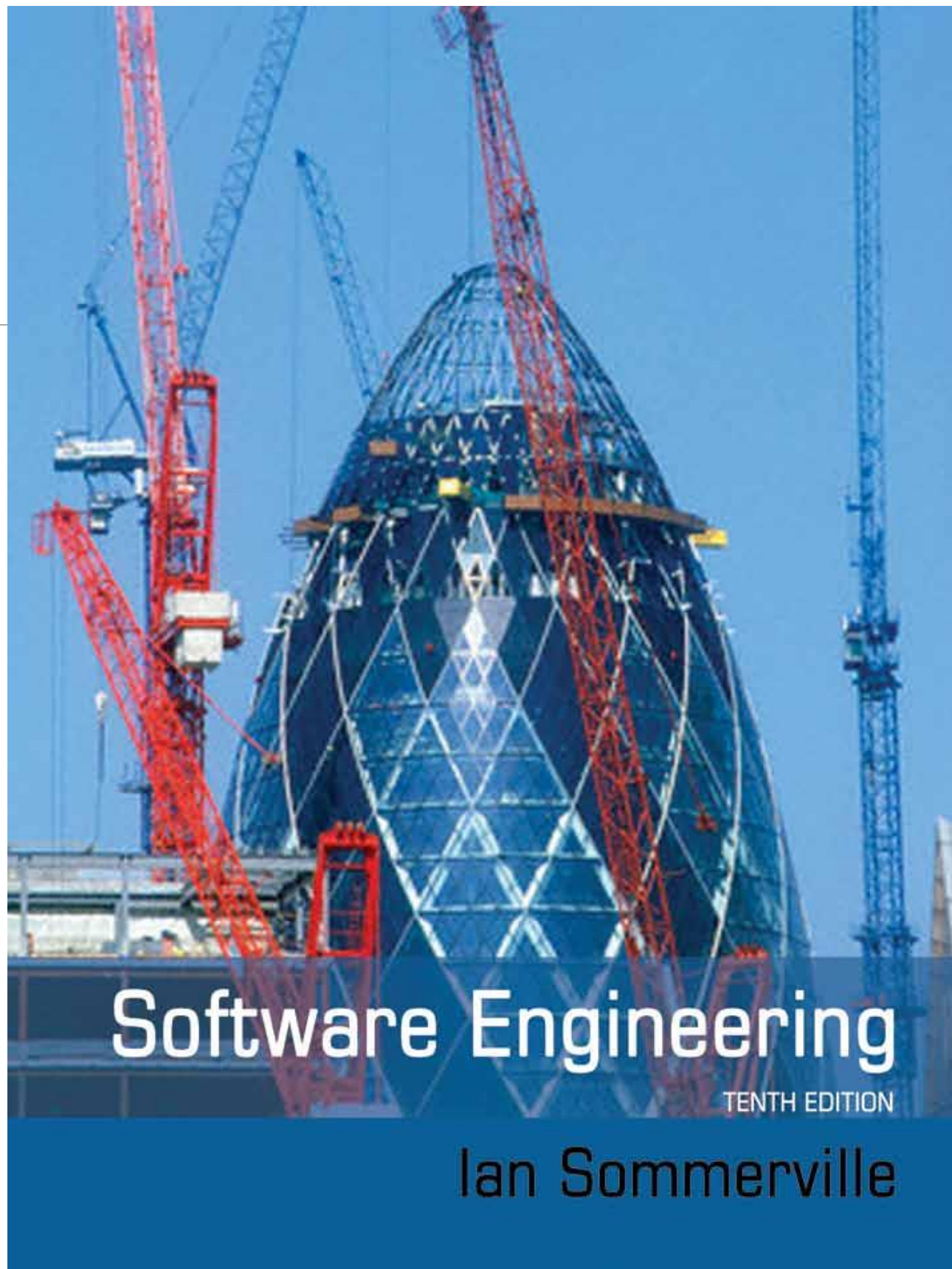
Software Engineering

TENTH EDITION

Ian Sommerville

Software products

There are three factors that drive the design of software products
- ◦ <mark>Business and consumer needs</mark> that are not met by current products
- ◦ <mark>Dissatisfaction</mark> with existing business or consumer software products
- ◦ <mark>Changes in technology</mark> that make completely new types of product possible

In the early stage of product development, you are trying to understand, what <mark>product features would be useful to users, and what they like and dislike</mark> about the products that they use.

BRANDI TYLER

PROFILE   Narrow Feet

GENDER   Female

AGE   36

LOCATION   Los Angeles, CA

OCCUPATION   Receptionist; $38k

"It's SO difficult to buy shoes that fit my feet."

MOTIVATIONS

Brandi gets very emotional about shopping for shoes in retail stores because she rarely can find a pair that fits her narrow feet. Recently, she's turned to online shopping to avoid the hassle of shopping in stores. Brandi found Munro after Googling "narrow width shoes" and reading other reviews online about the company.

GOALS

- Needs an SS (4A) width shoe
- Would like to purchase several pairs to fit occasion, style, and color
- Hoping to find that she doesn't have to sacrifice style or options when searching by fit

FRUSTRATIONS

- Not being able to filter available shoes by width
- Getting far fewer options when she applies width filter
- No other recommended shoes when she's looking at a pair she particularly likes

REAL MUNRO CUSTOMERS

"My whole life has been a choice between fit and style - when I was younger, I went for style & my feet killed me. As an adult, I tried for fit & the styles were for 95 year olds. This shoe is the 1st time I could get both."

"I wear a 4A and I have struggled my entire life finding shoes narrow enough for my feet and more so in recent years. I stumbled onto this Munro brand sandal and was shocked to find it comes in up to a 4A width and it actually fit and is like wearing a glove! I now have two pairs in different colors."

"Love these slides so much I went out and bought two more pairs. I have very narrow feet and they fit perfectly. They're very stylish and I get compliments whenever I wear them."

PERSONALARINIZI OLUŞTURUN

Scenarios

A scenario is a narrative that describes how a user, or a group of users, might use your system.

There is no need to include everything in a scenario – the scenario isn't a system specification.

It is simply a description of a situation where a user is using your product's features to do something that they want to do.

Scenario descriptions may vary in length from two to three paragraphs up to a page of text.

Table 3.5 Jack's scenario:using the iLearn system for class projects

Fishing in Ullapool

Jack is a primary school teacher in Ullapool, teaching P6 pupils. He has decided that a class project should be focused around the fishing industry in the area, looking at the history, development and economic impact of fishing.

As part of this, students are asked to gather and share reminiscences from relatives, use newspaper archives and collect old photographs related to fishing and fishing communities in the area. Pupils use an iLearn wiki to gather together fishing stories and SCRAN (a history archive site) to access newspaper archives and photographs. However, Jack also needs a photo-sharing site as he wants students to take and comment on each others' photos and to upload scans of old photographs that they may have in their families. He needs to be able to moderate posts with photos before they are shared, because pre-teen children can't understand copyright and privacy issues.

Jack sends an email to a primary school teachers' group to see if anyone can recommend an appropriate system. Two teachers reply and both suggest that he uses KidsTakePics, a photo-sharing site that allows teachers to check and moderate content. As KidsTakePics is not integrated with the iLearn authentication service, he sets up a teacher and a class account with KidsTakePics.

He uses the the iLearn setup service to add KidsTakePics to the services seen by the students in his class so that, when they log in, they can immediately use the system to upload photos from their phones and class computers.
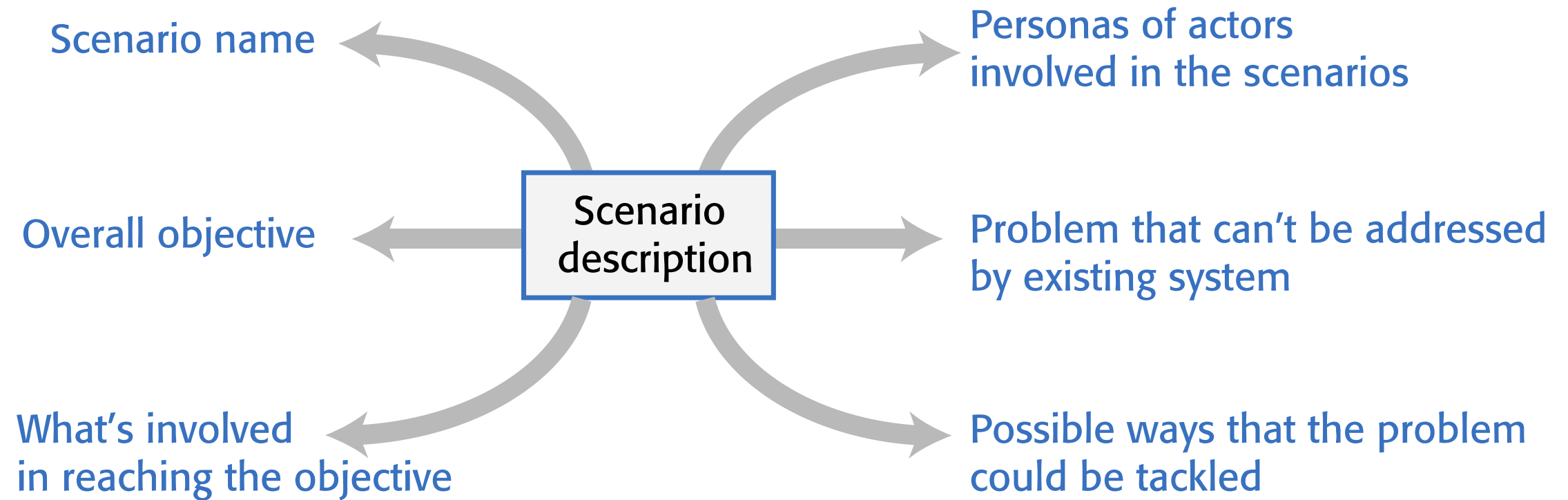
Table 3.1 A persona for a primary school teacher

Jack, a primary school teacher

Jack, age 32, is a primary school (elementary school) teacher in Ullapool, a large coastal village in the Scottish Highlands. He teaches children from ages 9-12. He was born in a fishing community north of Ullapool, where his father runs a marine fuels supply business and his mother is a community nurse. He has a degree in English from Glasgow University and retrained as a teacher after several years working as a web content author for a large leisure group.

Jack's experience as a web developer means that he is confident in all aspects of digital technology. He passionately believes that the effective use of digital technologies, blended with face to face teaching, can enhance the learning experience for children. He is particularly interested in using the iLearn system for project-based teaching, where students work together across subject areas on a challenging topic.

Figure 3.5 Elements of a scenario description

Scenario name

Overall objective

What's involved
in reaching the objective

Scenario
description

Personas of actors
involved in the scenarios

Problem that can't be addressed
by existing system

Possible ways that the problem
could be tackled

Scenario elements

A brief statement of the ==overall objective.==

- In Jack's scenario, this is to support a class project on the fishing industry.

References to the personas involved (Jack) so that you can get information about the capabilities and motivation of that user.

Information about what is involved in doing the activity. For example, in Jack's scenario this involves gathering reminiscences from relatives, accessing newspaper archives, etc.

An explanation of problems that ==can't be readily addressed using the existing system.==

- Young children don't understand issues such as copyright and privacy, so photo sharing requires a site that a teacher can moderate to make sure that published images are legal and acceptable.

A description of one way that the **identified problem** might be addressed.

- In Jack's scenario, the preferred approach is to use an external tool designed for school students.

Emma's scenario

Emma's scenario is different from Jack's scenario in that it describes a common and well-understood process rather than something new.

Emma is an e-learning sceptic and she is not interested in innovative applications. She wants a system that will make her life easier and reduce the amount of routine administration that she has to do.

The scenario discusses how parts of the process (setting up an email group and web page) are automated by the iLearn system.
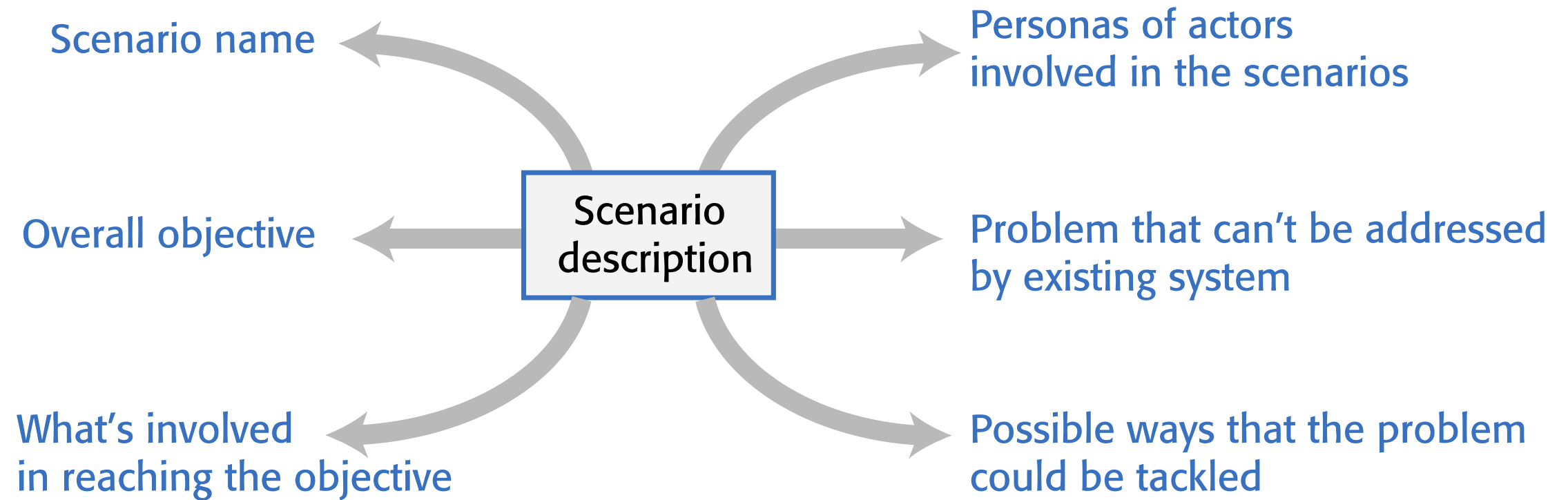
Figure 3.5 Elements of a scenario description

Table 3.6 Emma's scenario: using iLearn for administration

Emma is teaching the history of the First World War to a class of 14 year olds (S3). A group of S3 students are visiting the historic World War One battlefields in northern France. She want to set up a 'battlefields group' where the students who are attending the trip can share their research about the places they are visiting as well as their pictures and thoughts about the visit.

From home, she logs onto the iLearn system system using her Google account credentials. Emma has two iLearn accounts – her teacher account and a parent account associated with the local primary school. The system recognises that she is a multiple account owner and asks her to select the account to be used. She chooses the teacher account and the system generates her personal welcome screen. As well as her selected applications, this also shows management apps that help teachers create and manage student groups.

Emma selects the 'group management' app, which recognizes her role and school from her identity information and creates a new group. The system prompts for the class year (S3) and subject (history) and automatically populates the new group with all S3 students who are studying history. She selects those students going on the trip and adds her teacher colleagues, Jamie and Claire, to the group.

Scenario name

Overall objective

What's involved in reaching the objective

Scenario description

Personas of actors involved in the scenarios

Problem that can't be addressed by existing system
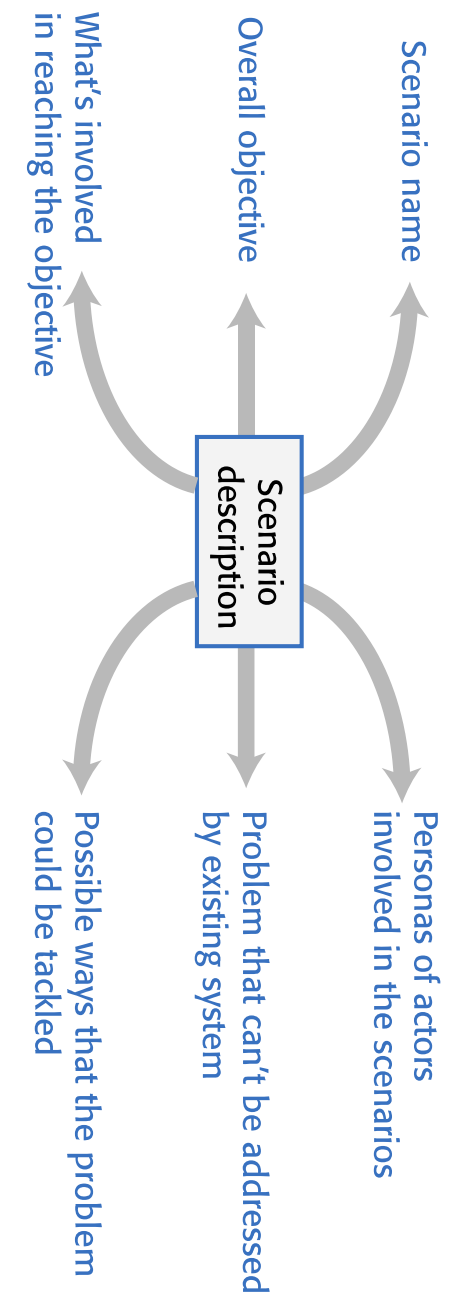
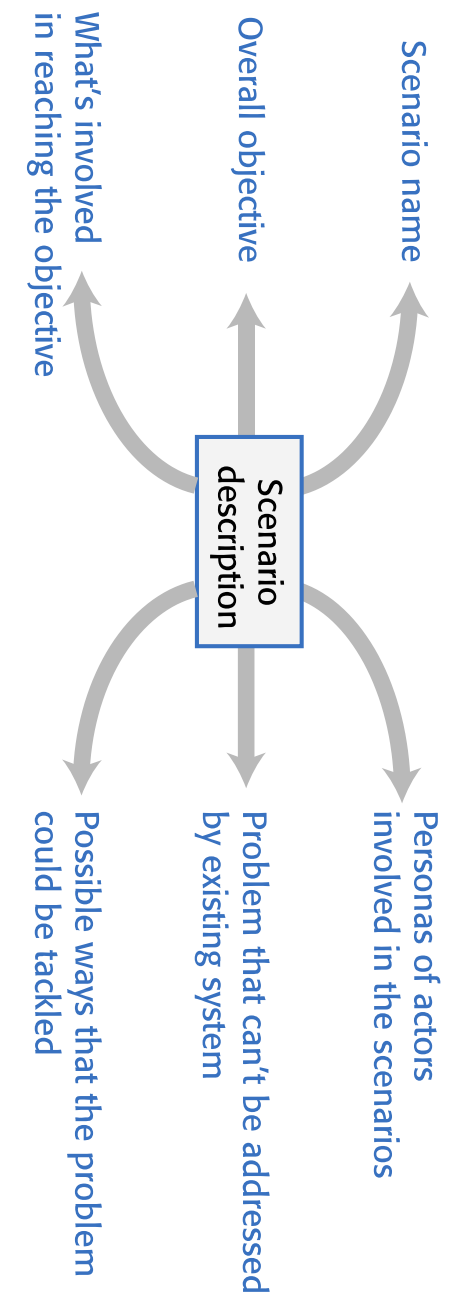Possible ways that the problem could be tackled

Table 3.6 Emma's scenario: using iLearn for administration

She names the group and confirms that it should be created. The app sets up an icon on her iLearn screen to represent the group, creates an email alias for the group and asks Emma if she wishes to share the group. She shares access with everyone in the group, which means that they also see the icon on their screen. To avoid getting too many emails from students, restricts sharing of the email alias to Jamie and Claire.

The group management app then asksEmma if she wishes to set up a group web page, wiki and blog. Emma confirms that a web page should be created and she types some text to be included on that page.

She then accesses flickr using the icon on her screen, logs in and creates a private group to share trip photos that students and teachers have taken. She uploads some of her own photos from previous trips and emails an invitation to join the photo-sharing group to the Battlefield email list. Emma uploads material from her own laptop that she has written about the trip to iLearn and shares this with the 'Battlefields Group'. This action adds her documents to the web page and generates an alert to group members that new material is available.

What's involved in reaching the objective

Overall objective

Scenario name

Scenario description

Possible ways that the problem could be tackled

Problem that can't be addressed by existing system

Personas of actors involved in the scenarios

Writing scenarios

Scenarios should always be written from the ==user's perspective== and ==based on identified personas or real users==.

Your starting point for scenario writing should be the personas that you have created. You should normally try to imagine several scenarios from each persona.

Ideally, ==scenarios should be general== and should not include implementation information.

◦ However, describing an implementation is often the easiest way to explain how a task is done.

It is important to ensure that you have coverage of all of the potential user roles when describing a system.

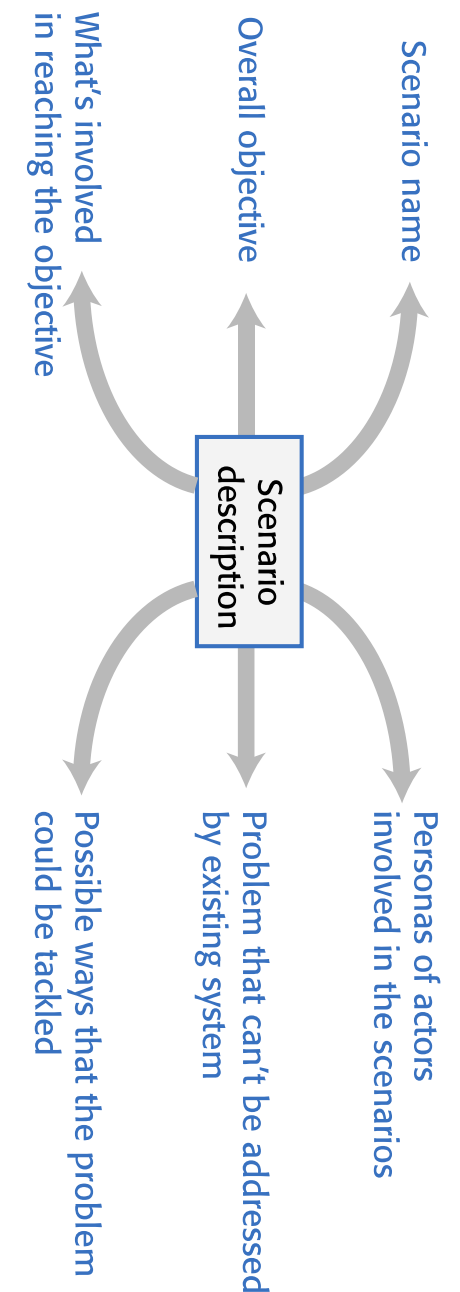Table 3.7 Elena's scenario: configuring the iLearn system

Elena has been asked by David, the head of the art department in her school, to help set up an iLearn environment for his department. David wants an environment that includes tools for making and sharing art, access to external websites to study artworks, and 'exhibition' facilities so that the students' work can be displayed.

Elena's starts by talking to art teachers to discover the tools that they recommend and the art sites that they use for studies. She also discovers that the tools they use and the sites they access vary according to the age of their students. Consequently, different student groups should be presented with a toolset that is appropriate for their age and experience.

Once she has established what is required, Elena logs into the iLearn system as an administrator and starts configuring the art environment using the iLearn setup service. She creates sub-environments for three age groups plus a shared environment that includes tools and sites that may be used by all students.

She drags and drops tools that are available locally and the URLs of external websites into each of these environments. For each of the sub-environments, she assigns an art teacher as its administrator so that they can refine the tool and web site selection that has been set up. She publishes the environments in 'review mode' and makes them available to the teachers in the art department.

After discussing the environments with the teachers, Elena shows them how to refine and extend the environments. Once they have agreed that the art environment is useful, it is released to all students in the school.

Scenario name

Overall objective

What's involved in reaching the objective

Scenario description

Personas of actors involved in the scenarios

Problem that can't be addressed by existing system

Possible ways that the problem could be tackled

User involvement

It is easy for anyone to read and understand scenarios, so it is possible to get users involved in their development.

The best approach is to develop an imaginary scenario based on our understanding of how the system might be used then ask users to explain what you have got wrong.
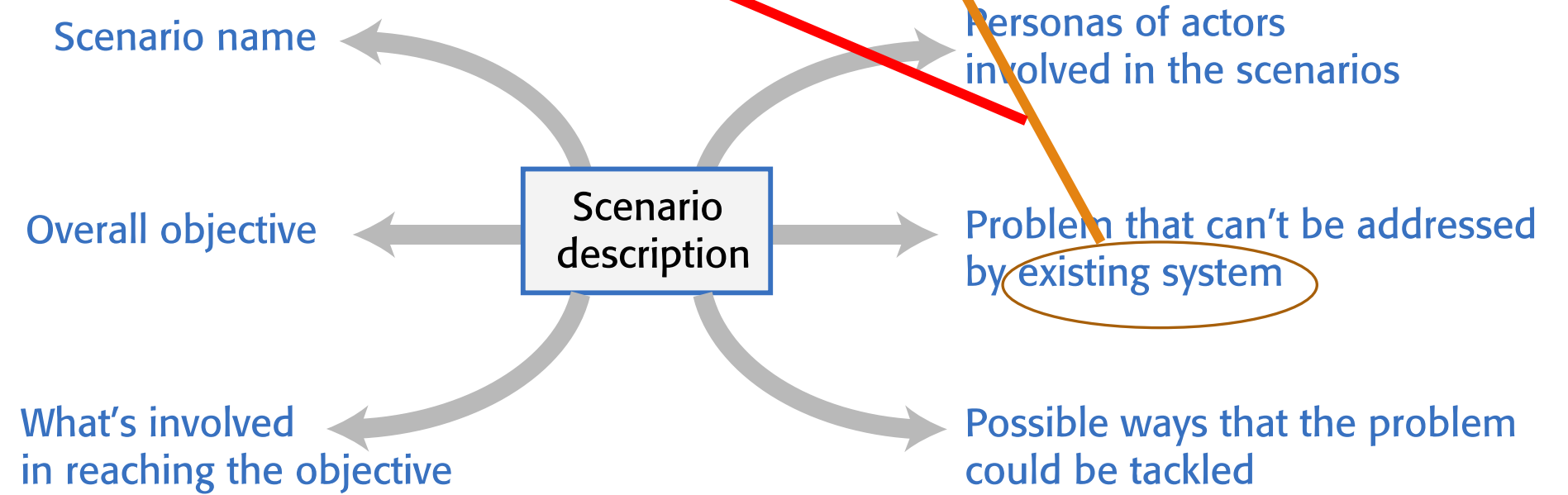
They might ask about things they did not understand and suggest how the scenario could be extended and made more realistic.

Our experience was that users are not good at writing scenarios.
◦ The scenarios that they created were based on how they worked at the moment. They were far too detailed and the users couldn't easily generalize their experience.
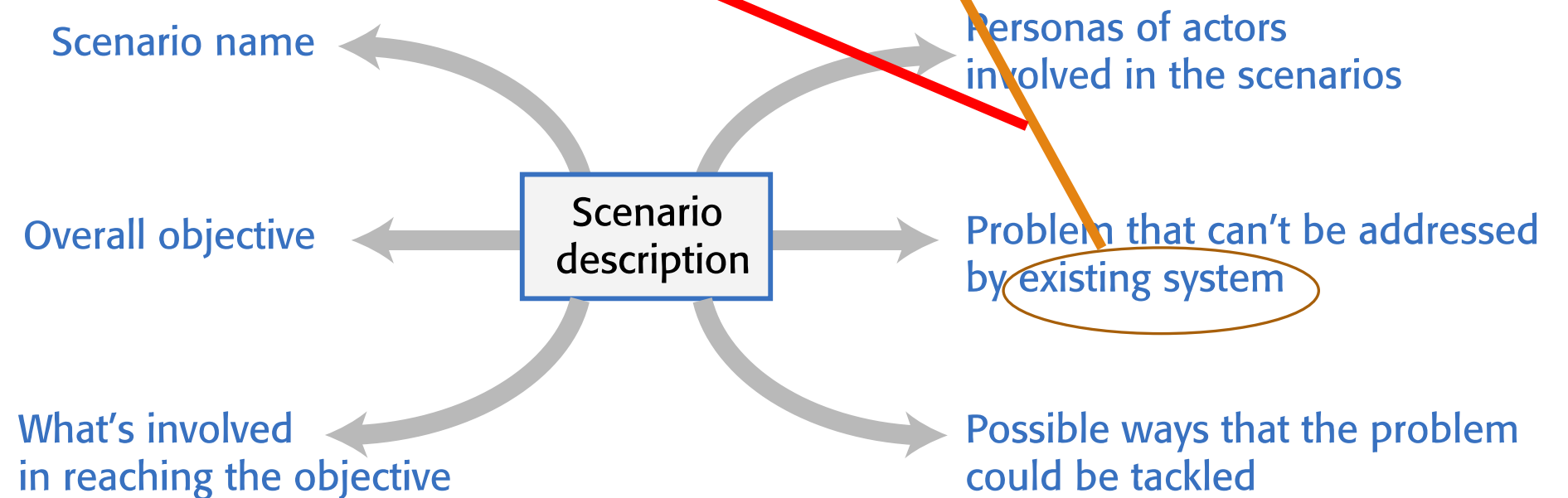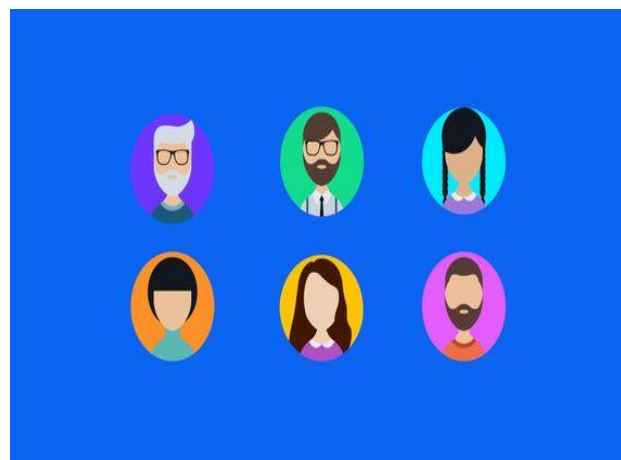
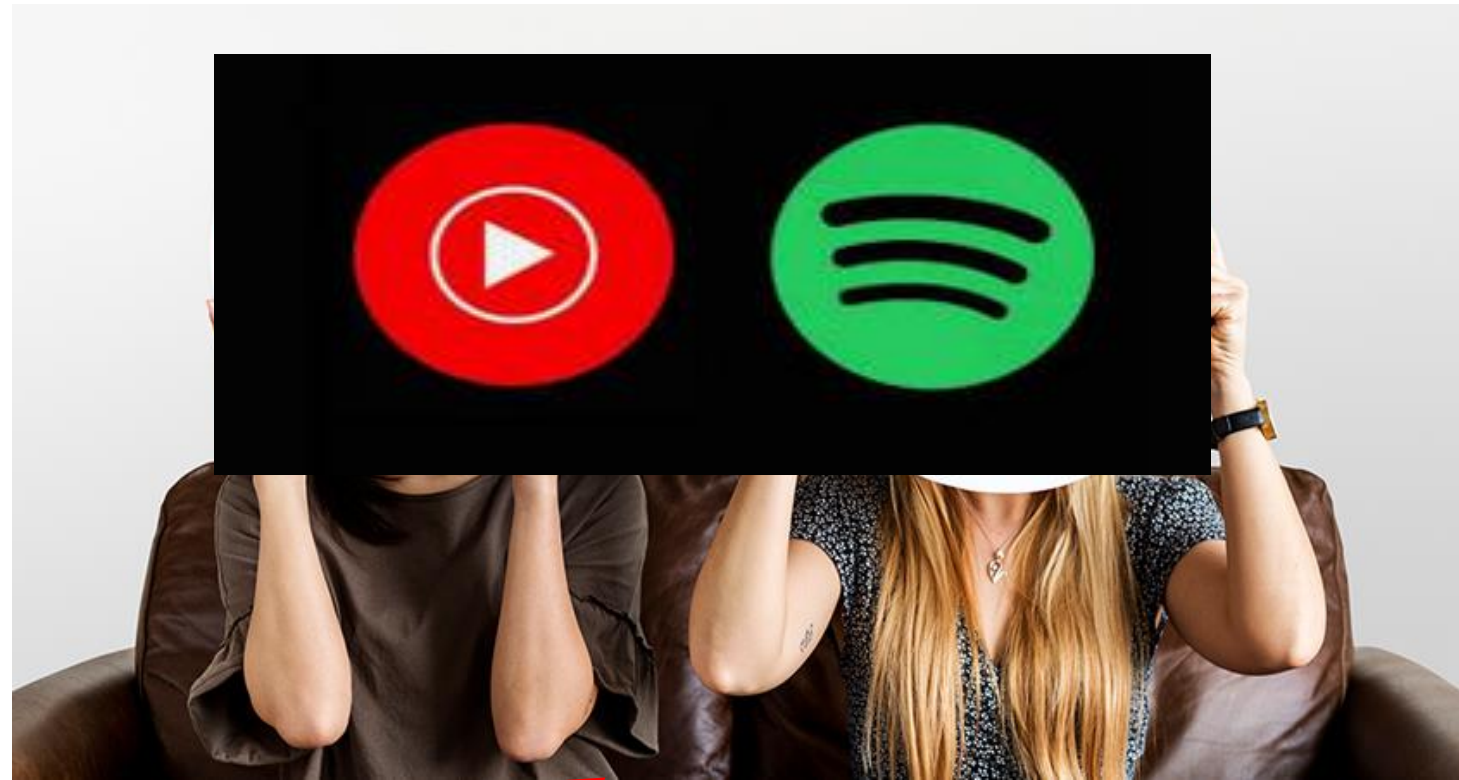# Uygulama Senaryosu Üretin

Tek: Donanım Haber
Çift: Epey

Uygulama Senaryosu Üretin

Tek: Instagram
Çift: Facebook

Scenario name

Personas of actors involved in the scenarios

Overall objective

Scenario description

Problem that can't be addressed by existing system

What's involved in reaching the objective

Possible ways that the problem could be tackled

User stories

Scenarios are high-level stories of system use. They should describe a sequence of interactions with the system but should not include details of these interactions.

User stories are finer-grain narratives that set out in a more detailed and structured way a single thing that a user wants from a software system.

- ◦ As an author, I need a way to organize the book that I'm writing into chapters and sections.

This story reflects what has become the standard format of a user story:

- ◦ **As a** <role>, I <want | need> **to** <do something>

  - ◦ As a teacher, I want to tell all members of my group when new information is available

A variant of this standard format adds a justification for the action:

- ◦ **As a** <role> I <want | need> **to** <do something> **so that** <reason>

  - ◦ As a teacher, I need to be able to report who is attending a class trip so that the school maintains the required health and safety records.

User stories in planning
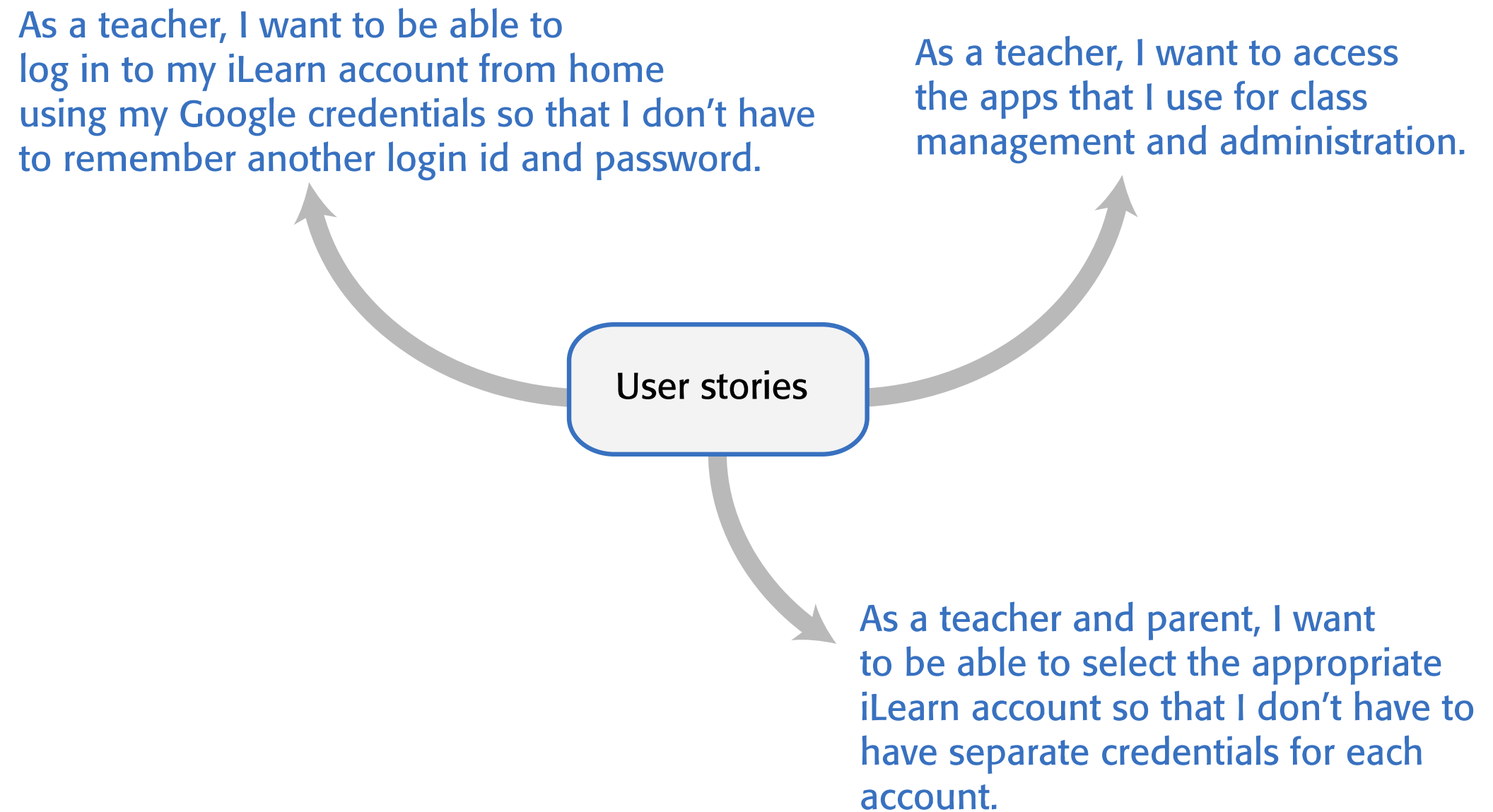
An important use of user stories is in planning.
- ◦ Many users of the Scrum method represent the product backlog as a set of user stories.

User stories should focus on a clearly defined system feature or aspect of a feature that can be implemented within a single sprint.

If the story is about a more complex feature that might take several sprints to implement, then it is called an epic.
- ◦ As a system manager, I need a way to backup the system and restore either individual applications, files, directories or the whole system.
- ◦ There is a lot of functionality associated with this user story. For implementation, it should be broken down into simpler stories with each story focusing on a single aspect of the backup system.

Figure 3.6 User stories from Emma's scenario

As a teacher, I want to be able to log in to my iLearn account from home using my Google credentials so that I don't have to remember another login id and password.

As a teacher, I want to access the apps that I use for class management and administration.

User stories

As a teacher and parent, I want to be able to select the appropriate iLearn account so that I don't have to have separate credentials for each account.
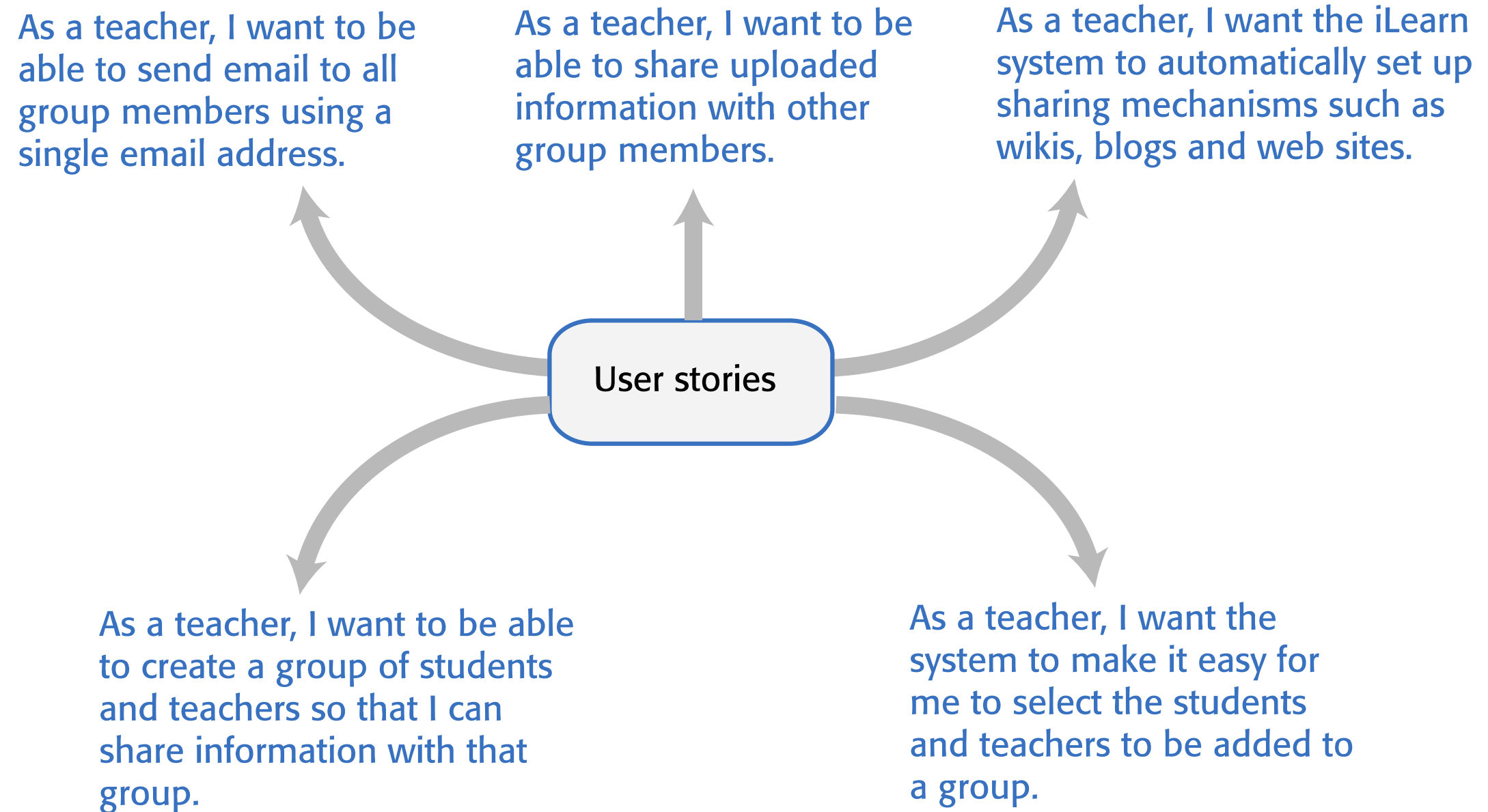
Feature description using user stories

Stories can be used to describe features in your product that should be implemented.

Each feature can have a set of associated stories that describe how that feature is used.

Figure 3.7 User stories describing the Groups feature

As a teacher, I want to be able to send email to all group members using a single email address.

As a teacher, I want to be able to share uploaded information with other group members.

As a teacher, I want the iLearn system to automatically set up sharing mechanisms such as wikis, blogs and web sites.

User stories

As a teacher, I want to be able to create a group of students and teachers so that I can share information with that group.

As a teacher, I want the system to make it easy for me to select the students and teachers to be added to a group.

As a <role>, I <want | need> **to** <do something>

Bir ….. Olarak … için…. Istiyorum/ihtiyacım var. Çünkü,

BİR ÖZELLİK

As a <role>, I <want | need> **to** <do something>

Bir ….. Olarak … için…. Istiyorum/ihtiyacım var. Çünkü,
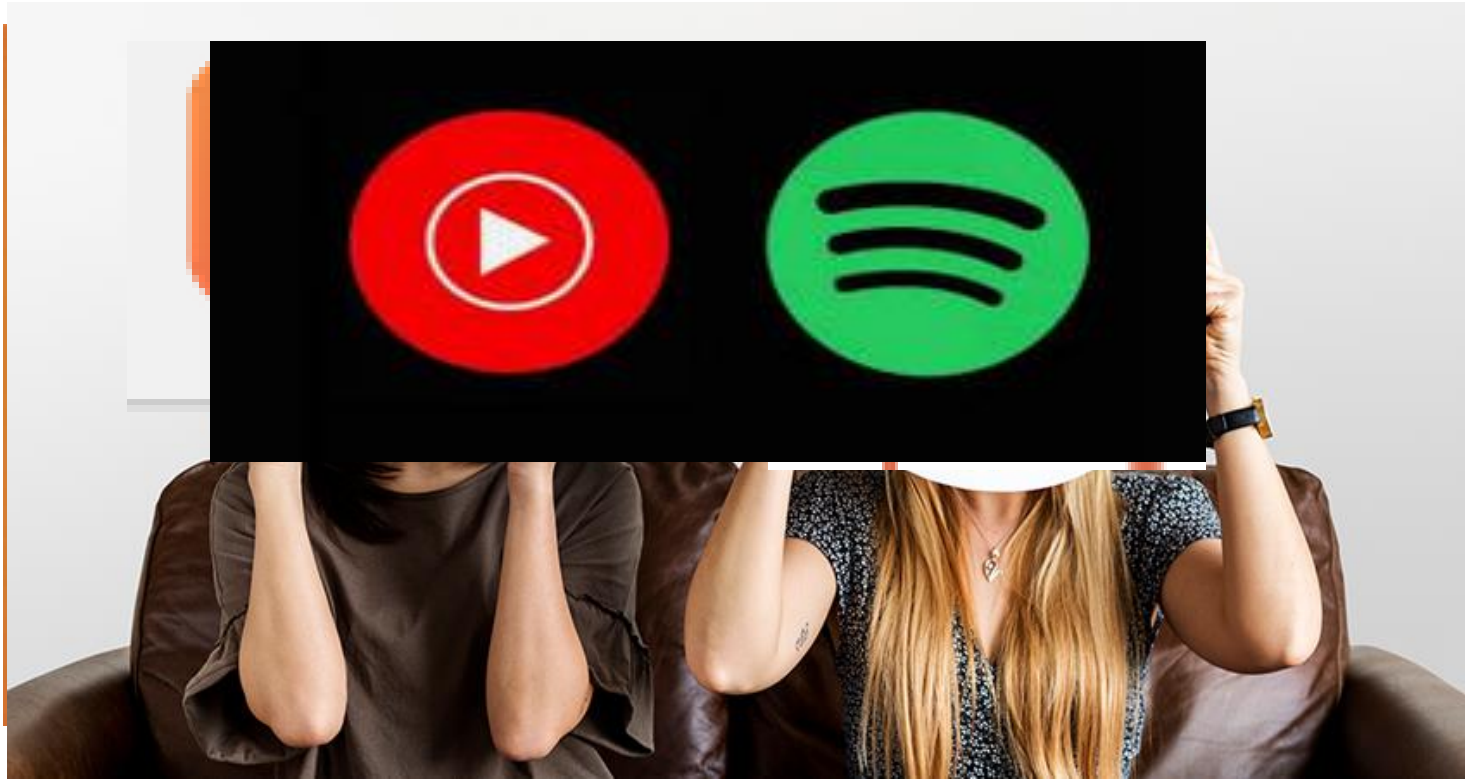
BİR ÖZELLİK

As a <role>, I <want | need> **to** <do something>

Bir ….. Olarak … için…. Istiyorum/ihtiyacım var. Çünkü,

BİR ÖZELLİK

"As a [user], I want [function], so that [action]."
Write it like this:
"The [user] wants [function] to achieve the goal of [user goal].
The current inability to do this is causing [adverse effect] for the organization."

Task Completion

"As Jane the Bank Teller, I want a preset shortcut list of one-touch transactions so that I can complete more transactions."

Success

"Jane the Bank Teller wants a preset shortcut list of one-touch transactions, to achieve the goal of getting customers through the line faster to minimize their frustration and automate lengthy transaction sequences. The current inability to do this is causing a significant percentage of customers to leave our bank for a competitor."

Stories and scenarios

As you can express all of the functionality described in a scenario as user stories, do you really need scenarios?'

Scenarios are more natural and are helpful for the following reasons:

- ◦ Scenarios read more naturally because they describe what a user of a system is actually doing with that system. People often find it easier to relate to this specific information rather than the statement of wants or needs set out in a set of user stories.

- ◦ If you are interviewing real users or are checking a scenario with real users, they don't talk in the stylized way that is used in user stories. People relate better to the more natural narrative in scenarios.

- ◦ Scenarios often provide more context - information about what the user is trying to do and their normal ways of working. You can do this in user stories, but it means that they are no longer simple statements about the use of a system feature.

Feature identification

Your aim in the initial stage of product design should be to create a list of features that define your product.

A feature is a way of allowing users to access and use your product's functionality so the feature list defines the overall functionality of the system.

Features should be independent, coherent and relevant:

- ◦ *Independence*
  Features should not depend on how other system features are implemented and should not be affected by the order of activation of other features.

- ◦ *Coherence*
  Features should be linked to a single item of functionality. They should not do more than one thing and they should never have side-effects.

- ◦ *Relevance*
  Features should reflect the way that users normally carry out some task. They should not provide obscure functionality that is hardly ever required.

Feature Independence

Calculator

❑additionModule,

❑subtractionModule,

❑divisionModule,

❑multiplicationModule

if you are working on additionModule then your module should be able to independently perform addition operation on recieving user input. It should not require to make any interaction with other modules like subtractionModule, multiplicationModule or etc.

Independence

Features should not depend on how other system features are implemented and should not be affected by the order of activation of other features.
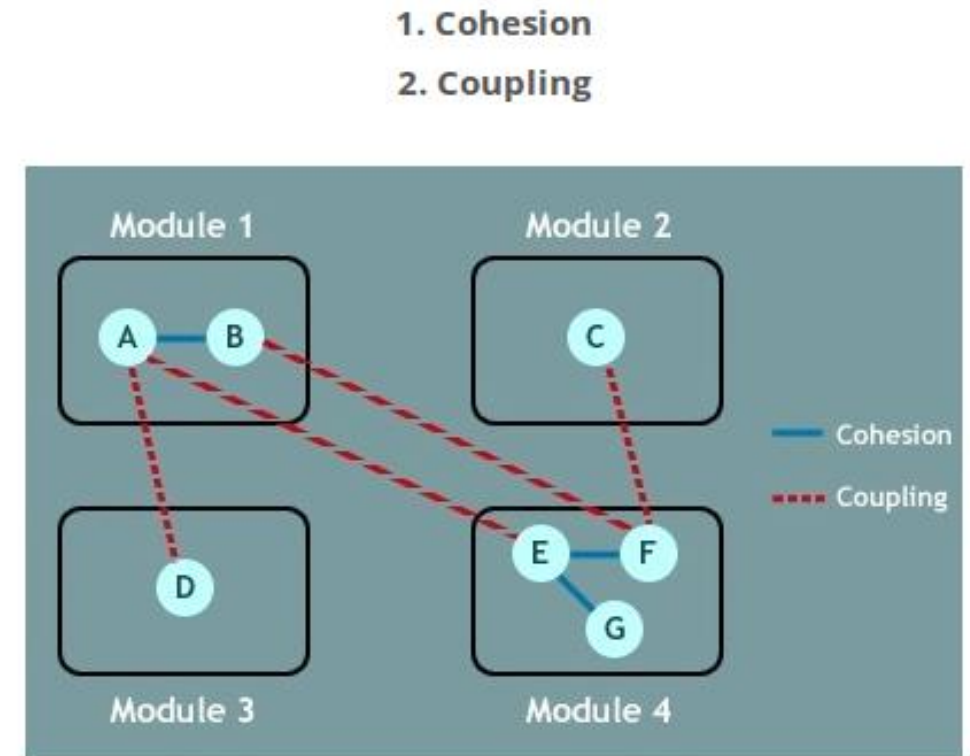
Feature Coherence

Print
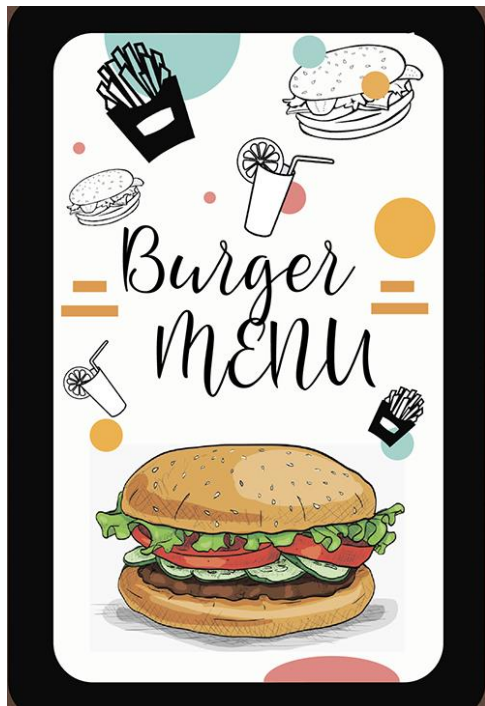
- Tutarlılık
- Bağlılık
- Uyum

cohesion

1. Cohesion
2. Coupling

Coherence

Features should be linked to a single item of functionality. They should not do more than one thing and they should never have side-effects.

coupling

Feature identification

Your aim in the initial stage of product design should be to create a list of features that define your product.

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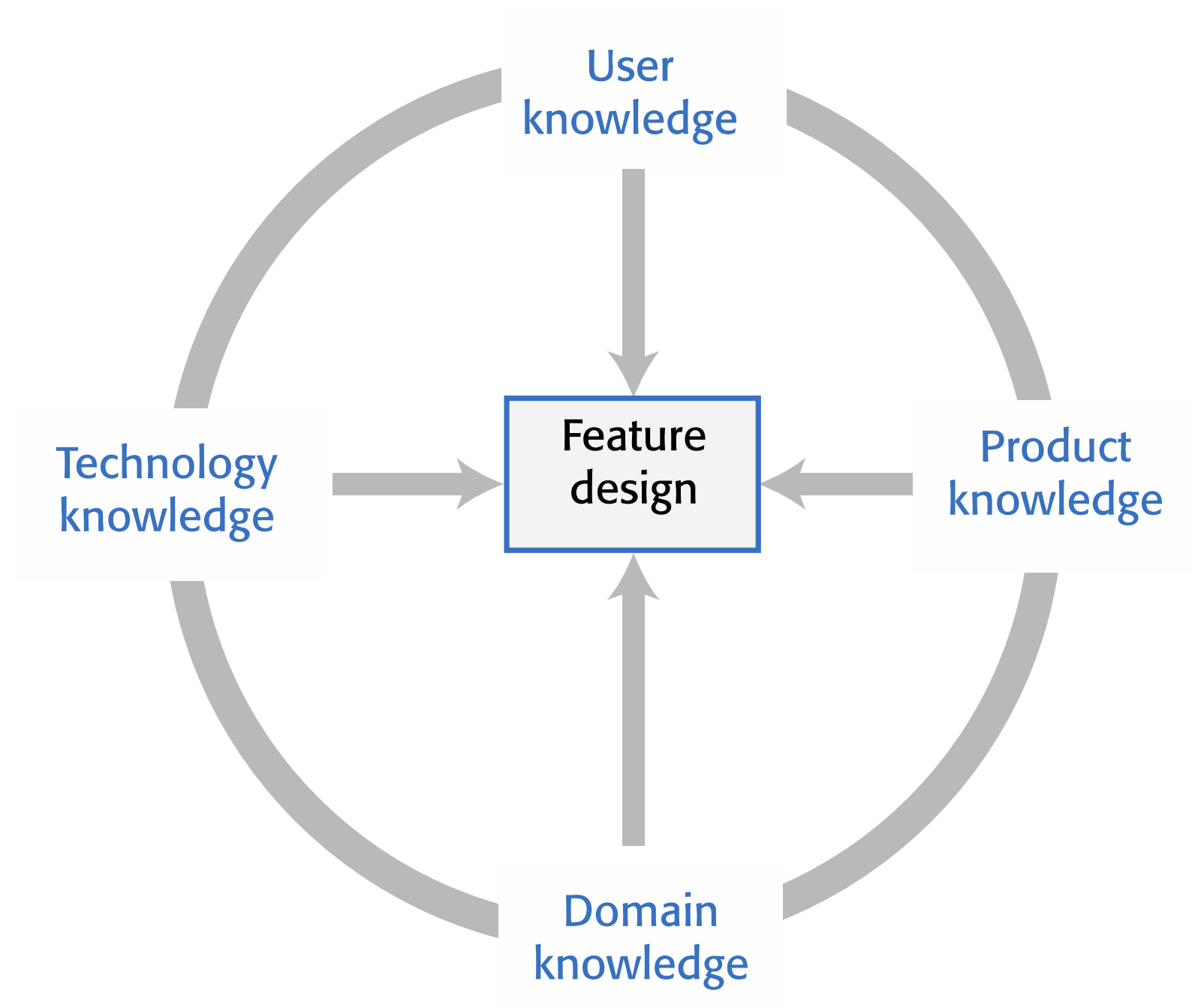
Figure 3.8 Feature design

Table 3.8 Knowledge required for feature design

User knowledge
You can use user scenarios and user stories to inform the team of what users want and how they might use it the software features.

Product knowledge
You may have experience of existing products or decide to research what these products do as part of your development process. Sometimes, your features have to replicate existing features in these products because they provide fundamental functionality that is always required.

Domain knowledge
This is knowledge of the domain or work area(e.g. finance, event booking) that your product aims to support. By understanding the domain, you can think of new innovative ways of helping users do what they want to do.

Technology knowledge
New products often emerge to take advantage of technological developments since their competitors were launched. If you understand the latest technology, you can design features to make use of it.
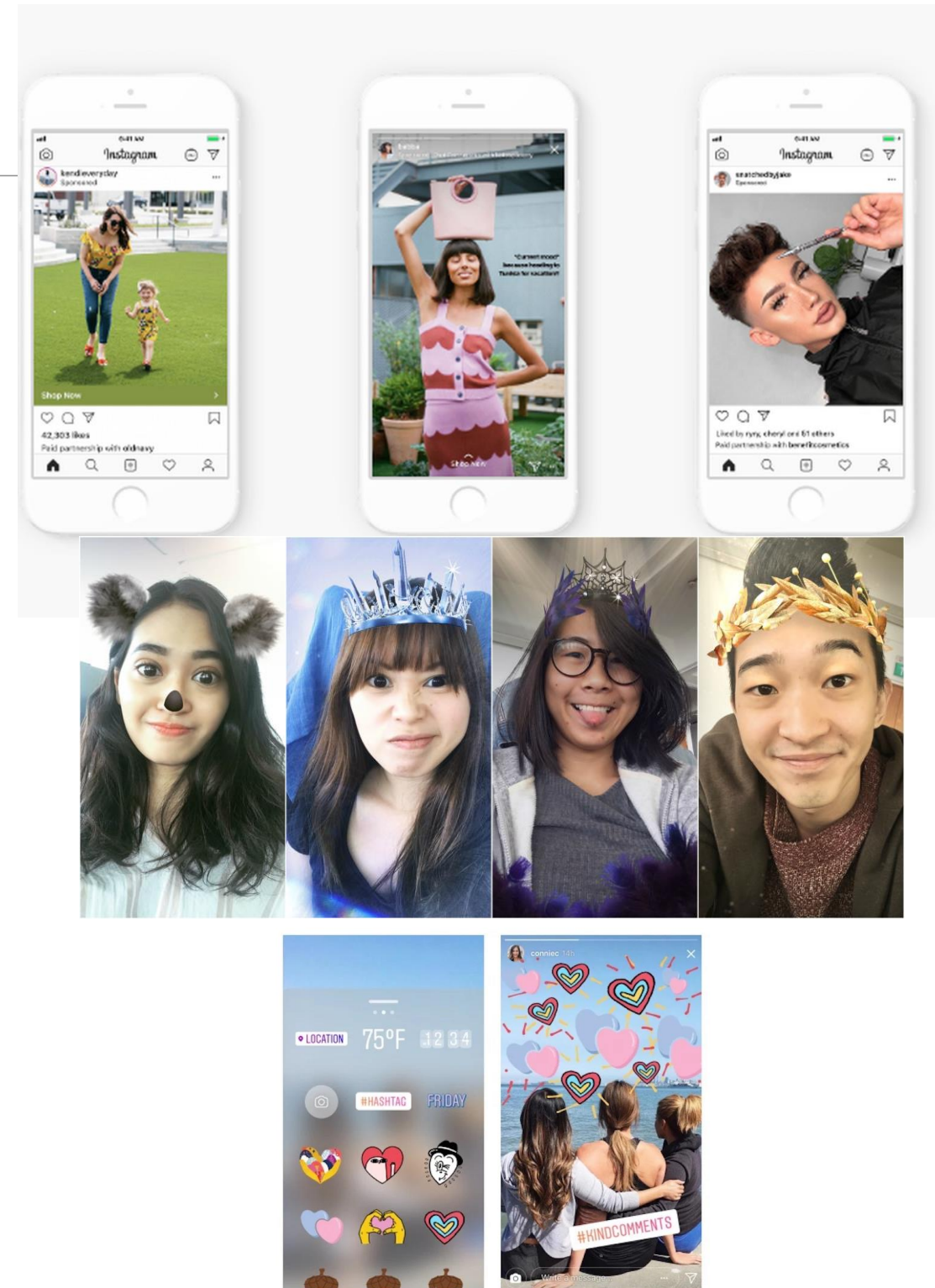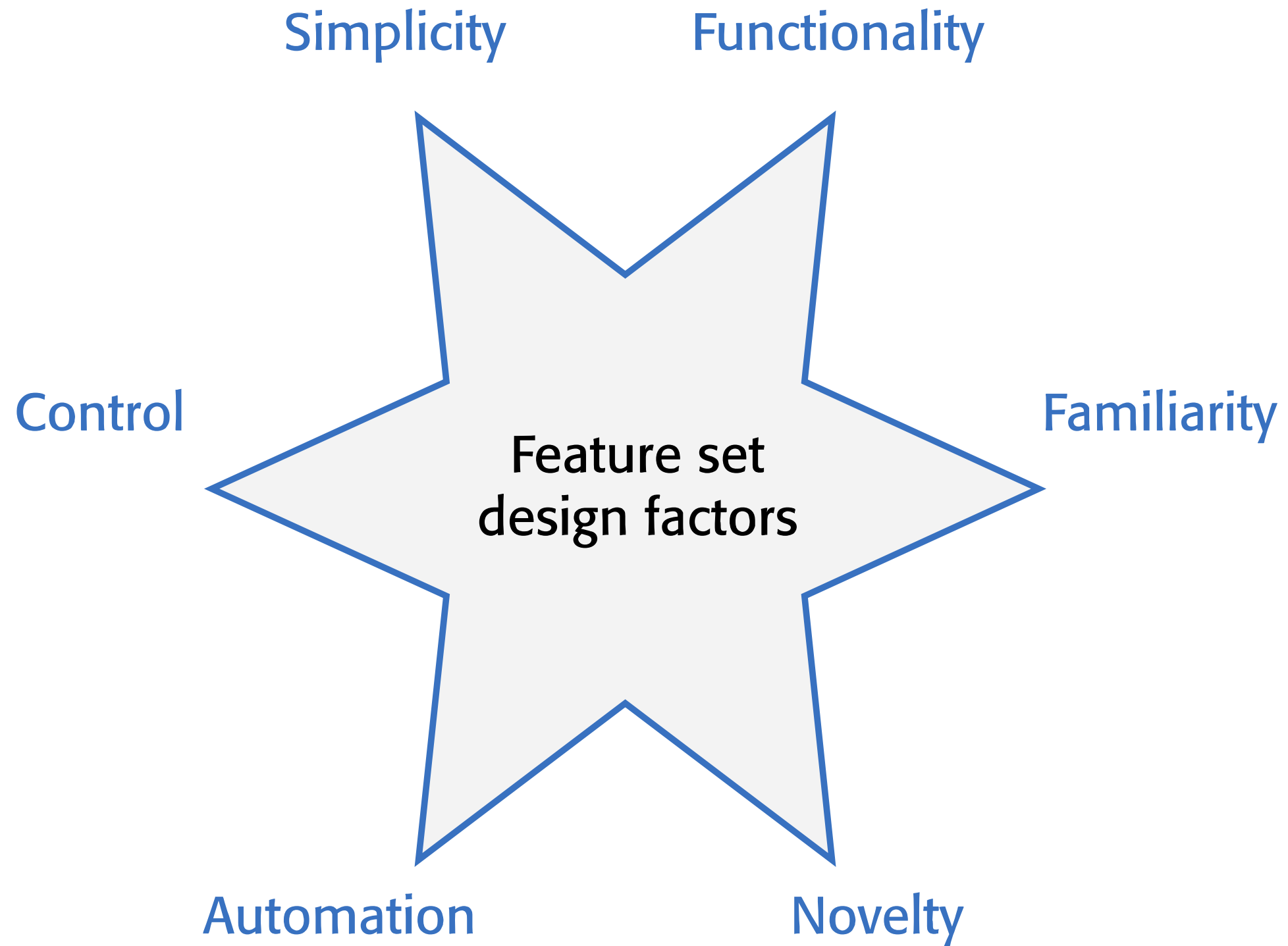
Figure 3.9 Factors in feature set design

Simplicity

Functionality

Control

Feature set
design factors

Familiarity

Automation

Novelty

Feature trade-offs

Simplicity and functionality
- ◦ You need to find a balance between providing a simple, easy-to-use system and including enough functionality to attract users with a variety of needs.

IDE

Familiarity and novelty
- ◦ Users prefer that new software should support the familiar everyday tasks that are part of their work or life. To encourage them to adopt your system, you need to find a balance between familiar features and new features that convince users that your product can do more than its competitors.

ICON/MENU

Automation and control
- ◦ Some users like automation, where the software does things for them. Others prefer to have control. You have to think carefully about what can be automated, how it is automated and how users can configure the automation so that the system can be tailored to their preferences.

?

Feature creep

Feature creep occurs when new features are added in response to user requests without considering whether or not these features are generally useful or whether they can be implemented in some other way.
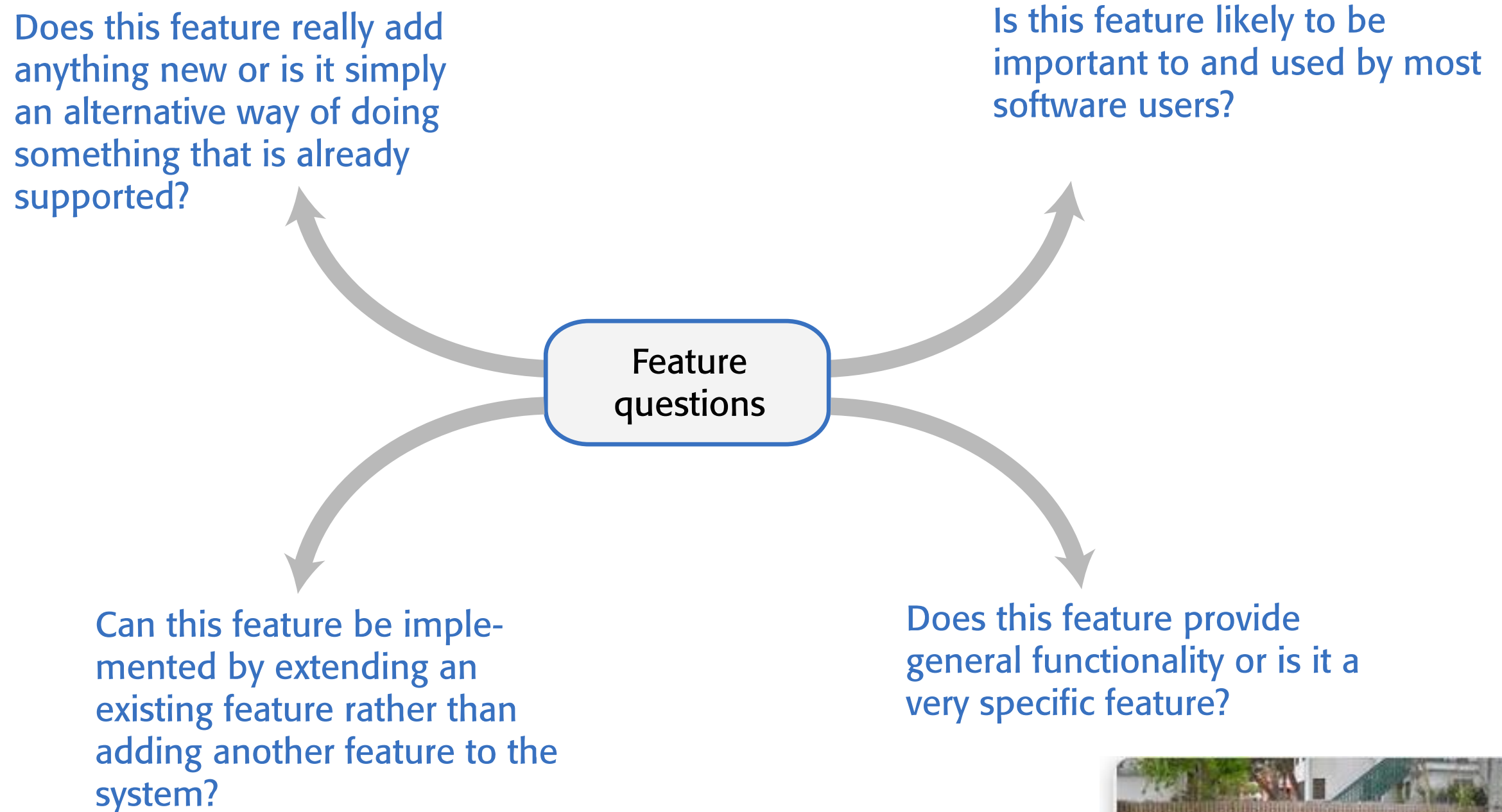
Too many features make products hard to use and understand

There are three reasons why feature creep occurs:

◦ Product managers are reluctant to say 'no' when users ask for specific features.

◦ Developers try to match features in competing products.

◦ The product includes features to support both inexperienced and experienced users.

Figure 3.10 Avoiding feature creep

Does this feature really add anything new or is it simply an alternative way of doing something that is already supported?

Is this feature likely to be important to and used by most software users?

Feature questions

Can this feature be implemented by extending an existing feature rather than adding another feature to the system?

Does this feature provide general functionality or is it a very specific feature?

Feature derivation

Features can be identified directly from the product vision or from scenarios.

You can highlight phrases in narrative description to identify features to be included in the software.

◦ You should think about the features needed to support user actions, identified by active verbs, such as use and choose.

Table 3.9 The iLearn system vision

FOR teachers and educators WHO need a way *to help students use web-based learning resources and applications*, THE iLearn system is an open learning environment THAT *allows the set of resources used by classes and students to be easily configured for these students and classes by teachers themselves*.

UNLIKE Virtual Learning Environments, such as Moodle, the focus of iLearn is the learning process itself, rather than the administration and management of materials, assessments and coursework. OUR product *enables teachers to create subject and age-specific environments for their students* using any web-based resources, such as videos, simulations and written materials that are appropriate

Features from the product vision

A feature that allows users to access and use existing web-based resources;

A feature that allows the system to exist in multiple different instantiations;

A feature that allows user configuration of the system to create a specific instantiation.

Table 3.10 Jack's scenario with ==highlighte==d phrases

Jack is a primary school teacher in Ullapool, teaching P6 pupils. He has decided that a class project should be focused around the fishing industry in the area, looking at the history, development and economic impact of fishing.

As part of this, students are asked to gather and share reminiscences from relatives, use newspaper archives and collect old photographs related to fishing and fishing communities in the area. *Students use an iLearn wiki* to gather together fishing stories and *SCRAN (a history archive) to access newspaper archives and photographs.* However, Jack also needs a photo-sharing site as he wants *pupils to take and comment on each others' photos* and to *upload scans of old photographs* that they may have in their families. He needs to be able to moderate posts with photos before they are shared, because pre-teen children can't understand copyright and privacy issues.

Jack *sends an email to a primary school teachers' group,* which he is a member of to see if anyone can recommend an appropriate system. Two teachers reply and both suggest that he uses KidsTakePics, a photo-sharing site that allows teachers to check and moderate content. As KidsTakePics *is not integrated with the iLearn authentication service*, he sets up a teacher and a class account with KidsTakePics.

He uses the the iLearn setup service to add KidsTakePics to the services seen by the students in his class so that when they log in, they can immediately use the system to upload photos from their phones and class computers.

Features from Jack's scenario

A wiki for group writing.

Access to the SCRAN history archive. This is a shared national resource that provides access to historical newspaper and magazine articles for schools and universities.

Features to set up and access an email group.

A feature to integrate applications with the iLearn authentication service.

The feature list

The output of the feature identification process should be a list of features that you use for designing and implementing your product.

There is no need to go into a lot of detail about the features at this stage. You add detail when you are implementing the feature.

You can describe features using a standard input-action-output template by using structured narrative descriptions or by a set of user stories.
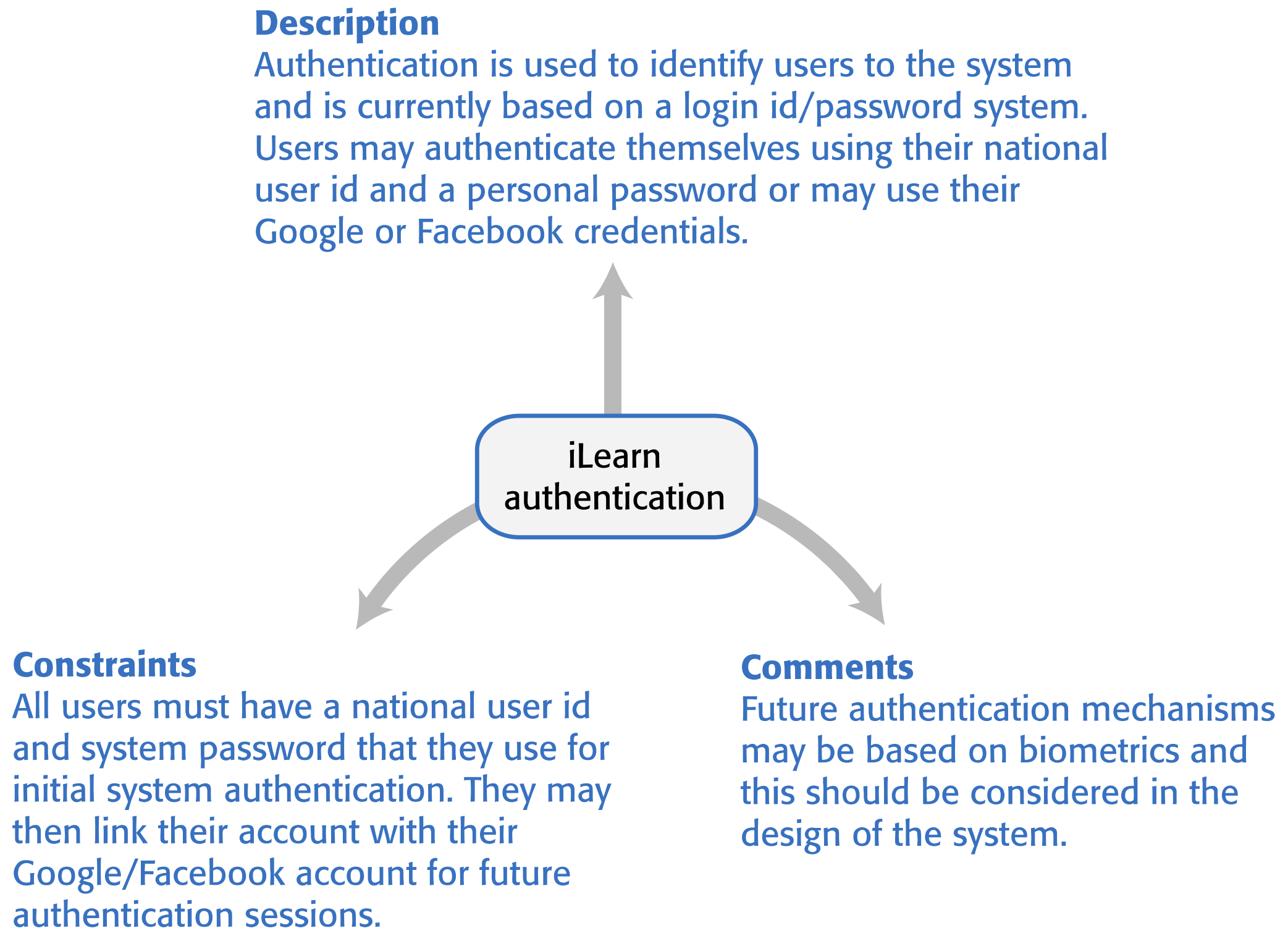
Figure 3.11 The iLearn authentication feature

Description
Authentication is used to identify users to the system and is currently based on a login id/password system. Users may authenticate themselves using their national user id and a personal password or may use their Google or Facebook credentials.

iLearn authentication

Constraints
All users must have a national user id and system password that they use for initial system authentication. They may then link their account with their Google/Facebook account for future authentication sessions.

Comments
Future authentication mechanisms may be based on biometrics and this should be considered in the design of the system.

Table 3.11 Feature description using user stories

Description
As a system manager, I want to create and configure an iLearn environment by adding and removing services to/from that environment so that I can create environments for specific purposes.

As a system manager, I want to set up sub-environments that include a subset of services that are included in another environment.

As a system manager, I want to assign administrators to created environments.

As a system manager, I want to limit the rights of environment administrators so that they cannot accidentally or deliberately disrupt the operation of key services.

As a teacher, I want to be able to add services that are not integrated with the iLearn authentication system.

Constraints
The use of some tools may be limited for license reasons so there may be a need to access license management tools during configuration.

Comments
Based on Elena's and Jack's scenarios

Innovation and feature identification

Scenarios and user stories should always be your starting point for identifying product features.

- ◦ Scenarios tell you how users work at the moment. They don't show how they might change their way of working if they had the right software to support them.

- ◦ Stories and scenarios are 'tools for thinking' and they help you gain an understanding of how your software might be used. You can identify a feature set from stories and scenarios.

User research, on its own, rarely helps you innovate and invent new ways of working.

You should also think creatively about alternative or additional features that help users to work more efficiently or to do things differently.

Key points 1

A software product feature is a fragment of functionality that implements something that a user may need or want when using the product.

The first stage of product development is to identify the list of product features in which you identify each feature and give a brief description of its functionality.

Personas are 'imagined users' where you create a character portrait of a type of user that you think might use your product.

A persona description should 'paint a picture' of a typical product user. It should describe their educational background, technology experience and why they might want to use your product.

A scenario is a narrative that describes a situation where a user is accessing product features to do something that they want to do.

Key points 2

Scenarios should always be written from the user's perspective and should be based on identified personas or real users.

User stories are finer-grain narratives that set out, in a structured way, something that a user wants from a software system.

User stories may be used as a way of extending and adding detail to a scenario or as part of the description of system features.

The key influences in feature identification and design are user research, domain knowledge, product knowledge, and technology knowledge.

You can identify features from scenarios and stories by highlighting user actions in these narratives and thinking about the features that you need to support these actions.