RakaS 2.0: Room Categorisation for Hospitals – Documentation

(Translation from the German original)

Color Legend (according to SIA 416)

- Main usable floor space (HNF)
- Secondary usable floor space (NNF)
- Functional area (FF)
- Circulation area (VF)
- Surrounding area (UF)
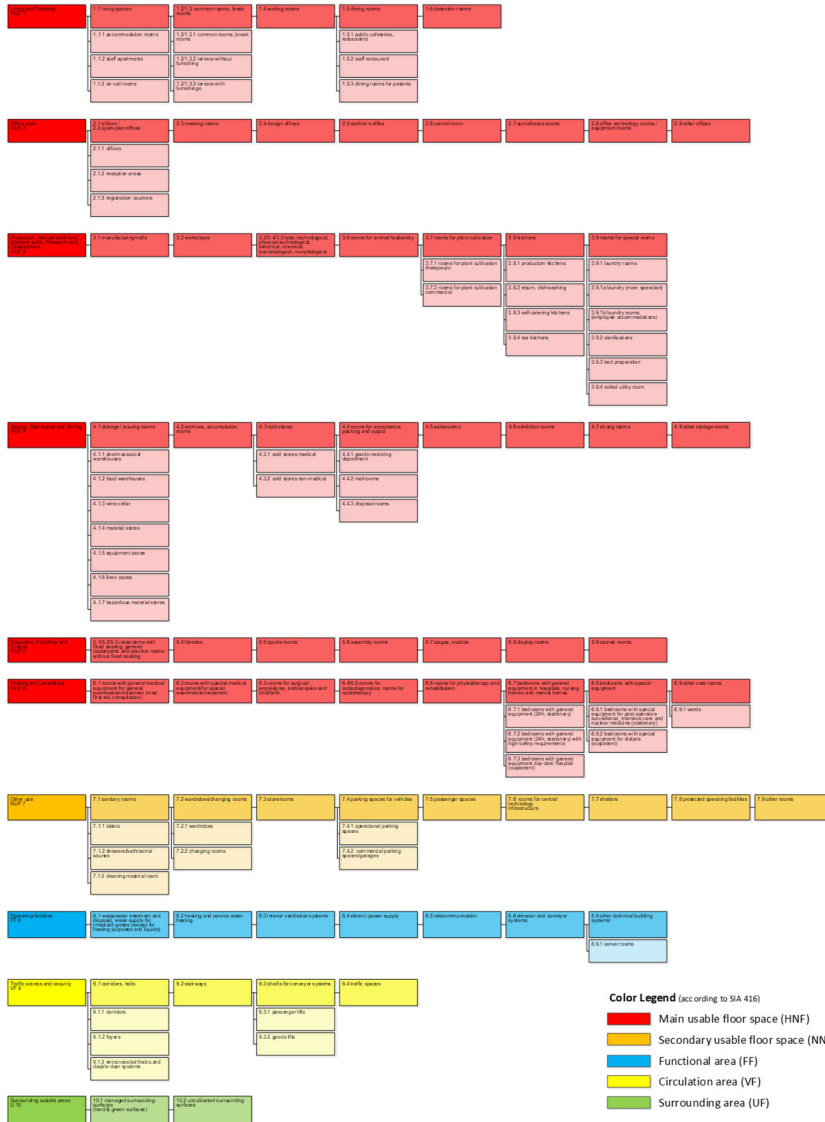
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Abstract

In the past years, different industry-wide room categorisation standards and norms for room definitions have been developed. They were, however, only partially applied in health organisations in Switzerland as they evidently didn't fulfil the need of Facility Management in Healthcare. Therefore, the standardised room categorisation for hospitals (RakaS) version 1.0 was presented in order to close this gap. This first version has now been evaluated and developed with the help of different partners in practice. In addition to a search of the literature, a multi-stage evaluation process was applied on the basis of consortium research principles and the inclusion of experts from practice.

In the beginning, a case study was conducted with one hospital. The resultant findings were used as a basis for a semi-structured interview guideline. Afterwards, expert interviews were conducted with managers responsible for room-specific tasks in the healthcare context. Hospitals of different categories were included. The results were analysed by means of content analysis principles. It was found that compared to the original version RakaS 1.0, only minor adaptations had to be made. One significant change is the introduction of a colour code for the differentiation of the room categories. In addition, a keyword index was implemented. The result from the evaluation iteration is RakaS version 2.0, firstly with a validated illustration of the room categorisation system, secondly with a tabular listing of the room categorisation system which indicates the definitions and sources for all rooms and categories, thirdly a keyword index and fourthly, the documentation presented here. In this way, a basis was created for a standardised space and room classification which contributes to a systematic visualisation of the portfolio of use of spaces and rooms, and can thus reveal potential for optimisation. In the process, the foundation has been laid for benchmarking between healthcare organisations, as well as the standardised transmission of data to digital models. Thus, better planning and calculation for necessary spaces and rooms can be reached in the future not only by optimising during the operational phase, but also in the construction phase.

Table of Contents

Table of Figures

Table of Abbreviations

DRG	Diagnosis-Related Group
FM in HC	Facility Management in Healthcare
IFM	Institute for Facility Management
KPI	Key Performance Indicator
LekaS	Service Catalogue for Non-Medical Services in Hospitals [German: Leistungskatalog für nicht-medizinische Leitungen in Spitälern]
RakaS	Room Categorisation for Hospitals [German: Raumkategorisierung für Spitäler]
SLA	Service Level Agreement
ZHAW	Zurich University of Applied Sciences

1   Introduction

First, the project is introduced, outlining the starting position, the goal, benefit and application of the project, as well as the methodological procedure, what topics are not dealt with and what the connection between the document and other partial projects is.

1.1   Starting Position

Ever since the introduction of the SwissDRG (case-based rate), the need for more transparency and benchmarking, particularly in the non-medical support services in hospitals, [FM in HC] has appeared. This also includes the survey of existing rooms and those needed, as well as their technical equipment.

A detailed standard for rooms (room types / room categories) and spaces specific to the hospital context was, however, only available to a limited extent; this was unfortunate, as it could have been an important basis for benchmarking. RakaS 1.0 took up this topic and presented a possible systematic room and space categorisation (Gerber, et al. 2017). The first version was based on of existing norms and standards. However, validation in practice had not yet been performed.

1.2   Goal

The goal was therefore to review the existing system for room categorisation, RakaS 1.0, with the help of experts from practice, and to adapt and refine it according to the results of this evaluation in order to finally obtain a practice-validated version: RakaS 2.0.

1.3   Benefit / Application

RakaS 2.0 will be available a basis for hospitals and other health institutions and should ensure that

- there is a common understanding within the industry
- the institutions become able to benchmark
- a systematic and transparent allocation of costs will be possible.

RakaS 2.0 is particularly applicable in the following areas:

- Space Management (data basis, room book etc.)
- Cleaning (definition of SLAs, offsetting etc.)
- Energy supply (optimisation)
- Safety and Security (ensuring safety & security, governance etc.)

As a general benefit, RakaS 2.0 is designed to serve as supplement of the Service Catalogue for Non-medical Services in Hospitals [LekaS] (Gerber & Kuchen, 2019).

1.4   Methodological Procedure

Initially, an extended literature search about standardisations and norms of rooms and space was conducted. In addition, different existing categorisation systems currently being applied in Swiss hospitals were investigated. Afterwards, a multi-stage evaluation was carried out using consortium research principles according to Österle und Otto (2009) to evaluate of RakaS 1.0. A case study workshop with one hospital, in which the room categorisation had just been revised and adapted, formed the basis for a semi-structured interview guideline (Flick, 2009a).

Accordingly, expert interviews were then conducted with specialists and managers responsible for room-specific tasks in healthcare organisations. The sample comprises eight Swiss hospitals within the following categories according to BAG (2018): General hospitals, "Zentrum" care (Level 1, University Hospitals); General hospitals, "Zentrum" care (Level 2); Psychiatric clinics (Level 1) and Special clinics (Surgery, Gynaecology/Neonatology, Paediatrics, Geriatrics, Diverse).

The quality criteria framework of Gerber et al. (2018) was chosen as the basis to address the issue outlined above. The main goal was to evaluate the benefit, practicability and feasibility by asking the following questions:

- Are the goal, the scope and contribution of the conceptual model clearly described?
- Is the context of the conceptual model relevant?
- Is the conceptual model economically efficient?
- Does practice accept and use the conceptual model?
- Does it fulfil the needs of the users?
- Does it solve the defined problem?
- Is it clearly readable and interpretable (language, symbols)?
- Is it easy to understand and identify the essential points?
- Does it have a systematic design and is it consistent (in meaning, structure, format and syntax)?
- Is it concise and compact?
- Can it be compared to other parallel models?

For the data analysis, the qualitative content analysis method was used (Flick, 2007; Mayring, 2010). The results were displayed in tabular form in matrices and put in context. The ordering of the content was mainly done using pre-defined codes and categories that followed the interview guideline (Flick, 2009b; Saldaña, 2009).

1.5   Delimitation

The study was limited to the German-speaking area of Switzerland.

1.6   References / Connection with other topics

Like the original version, RakaS 2.0 is based on existing norms and standards. The following foundations play an important role:

- General inter-industrial classifications which concentrate mainly on rooms (DIN 277-2: 2005; DIN 18960: 2008-02; SIA 416: 2003; SIA 0165: 2000)
- General classifications partially including healthcare (DIN 277-1: 2016)
- Specific healthcare classifications (DIN 13080-1999; DIN 13080: 2016; GEFMA 812: 2014-09)

All the documents developed throughout the project, as well as references to other related topics, are available under www.zhaw.ch/ifm/fm-healthcare/rakas/en.

1.7 Outlook

RakaS 2.0 can be further developed depending on the feedback from practice. In cooperation with an individual partner or in a group of interested healthcare organisations, the system could, for example, be further developed such that KPIs could be generated to use in cost calculations.

Should RakaS 2.0 be used sufficiently in practice, room/space benchmarking between healthcare organisations will be possible in the future.

It would be interesting to investigate the optimising potential in construction projects when RakaS is applied.

As a basis for the further development of RakaS 2.0, the concept must be used in health organisations and a dialogue between practice and university must be cultivated.

1.8 Feedback / Contact

For feedback or to make contact, we can be reached at

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2   Results

The results of the evaluation process of the room categorisation system are firstly a validated illustration, secondly a tabular listing of the room categorisation system, thirdly a keyword index and fourthly this documentation. The results will be briefly explained in the following chapters. All documents are freely available under www.zhaw.ch/ifm/fm-healthcare/rakas/en.

2.1   Illustration of the Room Categorisation System

The Room Categorisation for Hospitals RakaS 2.0 is illustrated in Figure 1. Compared to RakaS 1.0, the colour usage according SIA 416 was introduced:

red - Main usable floor space (HNF)

orange - Secondary usable floor space (HNF)

blue - Functional area (FF)

yellow - Circulation area (VF)

green - Surrounding area (UF)

In addition, some terms were adapted and the examples of rooms in the illustrated boxes were omitted. The detailed version of the illustration of the room categorisation system can be downloaded under https://www.zhaw.ch/storage/lsfm/institute-zentren/ifm/healthcare/rakas-2.0-illustration-room-categorisation-system.pdf.
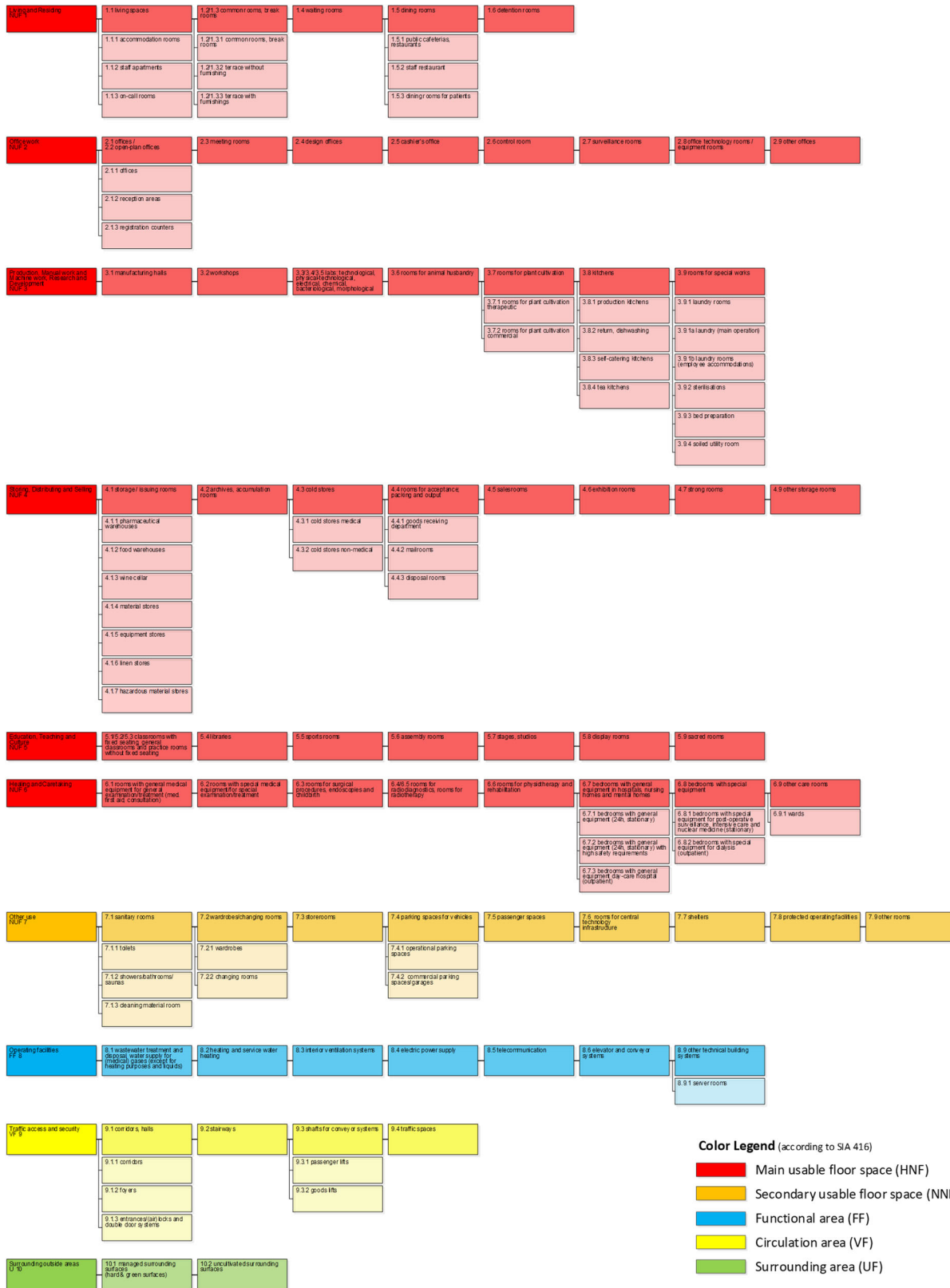
Figure 1: Illustration of the room categorisation system RakaS 2.0

URL: https://www.zhaw.ch/storage/lsfm/institute-zentren/ifm/healthcare/rakas-2.0-illustration-room-categorisation-system.pdf

Living and Residing NUF 1
- 1.1 living spaces
  - 1.1.1 accommodation rooms
  - 1.1.2 staff apartments
  - 1.1.3 on-call rooms
- 1.2/1.3 common rooms, break rooms
  - 1.2/1.3.1 common rooms, break rooms
  - 1.2/1.3.2 terrace without furnishing
  - 1.2/1.3.3 terrace with furnishings
- 1.4 waiting rooms
- 1.5 dining rooms
  - 1.5.1 public cafeterias, restaurants
  - 1.5.2 staff restaurant
  - 1.5.3 dining rooms for patients
- 1.6 detention rooms

Office work NUF 2
- 2.1 offices / 2.2 open-plan offices
  - 2.1.1 offices
  - 2.1.2 reception areas
  - 2.1.3 registration counters
- 2.3 meeting rooms
- 2.4 design offices
- 2.5 cashier's office
- 2.6 control room
- 2.7 surveillance rooms
- 2.8 office technology rooms / equipment rooms
- 2.9 other offices

Production, Manual work and Machine work, Research and Development NUF 3
- 3.1 manufacturing halls
- 3.2 workshops
- 3.3/3.4/3.5 labs: technological, physical-technological, electrical, chemical, bacteriological, morphological
- 3.6 rooms for animal husbandry
- 3.7 rooms for plant cultivation
  - 3.7.1 rooms for plant cultivation therapeutic
  - 3.7.2 rooms for plant cultivation commercial
- 3.8 kitchens
  - 3.8.1 production kitchens
  - 3.8.2 return, dishwashing
  - 3.8.3 self-catering kitchens
  - 3.8.4 tea kitchens
- 3.9 rooms for special works
  - 3.9.1 laundry rooms
  - 3.9.1a laundry (main operation)
  - 3.9.1b laundry rooms (employee accommodations)
  - 3.9.2 sterilisations
  - 3.9.3 bed preparation
  - 3.9.4 soiled utility room

Storing, Distributing and Selling NUF 4
- 4.1 storage / issuing rooms
  - 4.1.1 pharmaceutical warehouses
  - 4.1.2 food warehouses
  - 4.1.3 wine cellar
  - 4.1.4 material stores
  - 4.1.5 equipment stores
  - 4.1.6 linen stores
  - 4.1.7 hazardous material stores
- 4.2 archives, accumulation rooms
- 4.3 cold stores
  - 4.3.1 cold stores medical
  - 4.3.2 cold stores non-medical
- 4.4 rooms for acceptance, packing and output
  - 4.4.1 goods receiving department
  - 4.4.2 mailrooms
  - 4.4.3 disposal rooms
- 4.5 salesrooms
- 4.6 exhibition rooms
- 4.7 strong rooms
- 4.9 other storage rooms

Education, Teaching and Culture NUF 5
- 5.1/5.2/5.3 classrooms with fixed seating, general classrooms and practice rooms without fixed seating
- 5.4 libraries
- 5.5 sports rooms
- 5.6 assembly rooms
- 5.7 stages, studios
- 5.8 display rooms
- 5.9 sacred rooms

Healing and Caretaking NUF 6
- 6.1 rooms with general medical equipment for general examination/treatment (med. first aid consultation)
- 6.2 rooms with special medical equipment/for special examination/treatment
- 6.3 rooms for surgical procedures, endoscopies and childbirth
- 6.4/6.5 rooms for radiodiagnostics, rooms for radiotherapy
- 6.6 rooms for physiotherapy and rehabilitation
- 6.7 bedrooms with general equipment in hospitals, nursing homes and mental homes
  - 6.7.1 bedrooms with general equipment (24h, stationary)
  - 6.7.2 bedrooms with general equipment (24h, stationary) with high safety requirements
  - 6.7.3 bedrooms with general equipment day-care hospital (outpatient)
- 6.8 bedrooms with special equipment
  - 6.8.1 bedrooms with special equipment for post-operative surveillance, intensive care and nuclear medicine (stationary)
  - 6.8.2 bedrooms with special equipment for dialysis (outpatient)
- 6.9 other care rooms
  - 6.9.1 wards

Other use NUF 7
- 7.1 sanitary rooms
  - 7.1.1 toilets
  - 7.1.2 showers/bathrooms/saunas
  - 7.1.3 cleaning material room
- 7.2 wardrobes/changing rooms
  - 7.2.1 wardrobes
  - 7.2.2 changing rooms
- 7.3 storerooms
- 7.4 parking spaces for vehicles
  - 7.4.1 operational parking spaces
  - 7.4.2 commercial parking spaces/garages
- 7.5 passenger spaces
- 7.6 rooms for central technology infrastructure
- 7.7 shelters
- 7.8 protected operating facilities
- 7.9 other rooms

Operating facilities FF 8
- 8.1 wastewater treatment and disposal, water supply for medical gases (except for heating purposes and liquids)
- 8.2 heating and service water heating
- 8.3 interior ventilation systems
- 8.4 electric power supply
- 8.5 telecommunication
- 8.6 elevator and conveyor systems
- 8.9 other technical building systems
  - 8.9.1 server rooms

Traffic access and security VF 9
- 9.1 corridors, halls
  - 9.1.1 corridors
  - 9.1.2 foyers
  - 9.1.3 entrances/(air) locks and double door systems
- 9.2 stairways
- 9.3 shafts for conveyor systems
  - 9.3.1 passenger lifts
  - 9.3.2 goods lifts
- 9.4 traffic spaces

Surrounding/outside areas U 10
- 10.1 managed surrounding surfaces (hard & green surfaces)
- 10.2 uncultivated surrounding surfaces

Color Legend (according to SIA 416)
- Main usable floor space (HNF)
- Secondary usable floor space (NNF)
- Functional area (FF)
- Circulation area (VF)
- Surrounding area (UF)

2.2   Tabular Listing of Room Categorisation System

The tabular listing of the room categorisation system contains detailed information for the categories and rooms illustrated in Figure 1. The table is set up as follows:

Row 1   names the respective main category.

Row 2   lists the room types which mainly correspond with DIN 277-1:2005, partially amended using the definitions in DIN 277-1:2016 as well as newly-added categories.

Row 3   indicates the sources of the definitions in row 2: This makes it possible to find the original texts if needed in order to differentiate between the original definitions and the definitions of this project.

Row 4   defines and determines the room categories.

Row 5   justifies differentiations.

In Figure 2, the principle of the table is presented by the means of an extract. The detailed version of the table can be downloaded under https://www.zhaw.ch/storage/lsfm/institute-zentren/ifm/healthcare/rakas-2.0-tabular-listing-room-categorisation-system.xlsx.

Room Category	Room type/-naming	Source / Notes on	Definition/Specification IFM	Reasons for content-related differentiating
Living and Residing (NUF 1)	-	DIN 277-1:2016	living spaces, common rooms, waiting rooms and dining rooms	-
	1.1 living spaces	DIN 277-2:2005	living rooms and bedrooms in apartments, accommodations and employee apartments incl. eat-in kitchens, balconies, porches belonging to accommodation unit; on-call rooms	-
	1.1.1 accommodation rooms	DIN 277-1:2016	rooms of patient or guest hotels incl. eat-in kitchens, balconies, porches belonging to accommodation unit; on-call rooms	-
	1.1.2 staff apartments	Project	rooms of employee apartments incl. eat-in kitchens, balconies, porches belonging to accommodation unit; on-call rooms	-
	1.1.3 on-call rooms	Project	on-call rooms for employees with washrooms and beds	Only temporary use vs. permanent use in residential rooms
	1.2/1.3 common rooms, break rooms	Project, DIN277-1:2016, DIN 277-2:2005	common rooms, day rooms, break rooms, quiet rooms incl. adjacent balconies and terraces	-
	1.2/1.3.1 common rooms, break rooms	Project, DIN277-1:2016, DIN 277-2:2005	common rooms, day rooms, break rooms, quiet rooms incl. adjacent balconies	Inside rooms have a different standard of maintenance and cleaning to outside areas
	1.2/1.3.2 terrace without furnishings	Project	terraces with furnishings (fixed or mobile)	Outside areas have a different standard for maintenance and cleaning to inside rooms
	1.2/1.3.3 terrace with furnishings	Project	terraces with furnishings (fixed or mobile)	Outside areas have a different standard for maintenance and cleaning to inside rooms; furniture causes more cost for handling, cleaning and maintenance
	1.4 waiting rooms	DIN 277-2:2005	waiting rooms for patients for examination/therapy	-
	1.5 dining rooms	DIN 277-2:2005	dining rooms and cafeterias for patients, employees and guests	-
	1.5.1 public cafeterias, restaurants	Project, DIN 277-2:2005	cafeterias and restaurants publicly accessible, served or self-service	Have longer opening hours and more extensive infrastructure compared to staff restaurant
	1.5.2 staff restaurant	Project	Restaurants for staff only, served or self-service, open only during peak periods, less extensive infrastructure compard to public restaurant	Have shorter opening hours and less extensive infrastructure compared to public restaurants and cafeterias
	1.5.3 dining rooms for patients	Project	dining rooms for patients, in the wards	-
	1.6 detention rooms	DIN 277-2:2005	n/a	(see 6.7.2 bedrooms with general equipment (24h) with high safety requirements

Figure 2: Extract of tabular listing of room categorisation system RakaS 2.0

URL: https://www.zhaw.ch/storage/lsfm/institute-zentren/ifm/healthcare/rakas-2.0-tabular-listing-room-categorisation-system.xlsx **Keyword Index**

All the categories and rooms as well as inferable types of use were included in the setup of the keyword index. In addition, terms mentioned during the interviews were also taken into account and were added. The entries refer to the categories in the room category system.

Link to the keyword index: https://www.zhaw.ch/storage/lsfm/institute-zentren/ifm/healthcare/rakas-2.0-keyword-index.pdf

2.4 Documentation

The documentation presented here serves to explain the idea behind RakaS 2.0 and the formation and evaluation process, as well as to support its application in practice.

Download link: www.zhaw.ch/ifm/fm-healthcare/rakas/en

3   Application of RakaS 2.0

RakaS 2.0 can be applied for both the systematic introduction of new and the transfer of existing room/space definitions, as well as to discuss optimisations of space/room portfolios.

3.1   Introduction of New internal Room/Space Definition

RakaS can be used for the introduction of room and space definitions.

Note:

If there are rooms or spaces in an organisation which are not defined as such in RakaS, the general terms (e.g. "7.9 other rooms") can be used. It is, however, also possible to add additional categories or rooms and thus to refine and tailor the illustration for individual use.

3.2   Standardisation of Internal Room/Space Definitions

Existing internal room/space definitions can be standardised with the help of RakaS 2.0. In the tabular listing of the room categorisation system, the definitions of the terms and their mapping are available.

Notes:

If there are rooms or spaces in an organisation which are not defined as such in RakaS, the general terms (e. g. "7.9 other rooms") can be used. It is, however, also possible to add additional categories or rooms and thus to refine and tailor the illustration for individual use.

With the help of the keyword index, the corresponding categories and rooms can be searched and found with little effort thanks to the suggested classification.

3.3   Discussion and Optimisation of the Space/Room Portfolio

By using consistent space and room definitions and the corresponding clear and shared understanding, discussions about how existing spaces and rooms fit in the overall context can be held. Where the effective usage differs significantly from the original definition, a repurposing and/or reutilisation can be addressed based on facts. In any event, the optimisation potential of existing spaces/rooms will become apparent.

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