LABOR et EDUCATIO
No. 7/2019

STUDIES

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The Importance of Research-Based Learning as a Didactic Necessity in German Public Health Degree Programs

Znaczenie kształcenia opartego na badaniach naukowych w programach studiów dydaktycznych – w niemieckich programach studiów w zakresie zdrowia publicznego

1. Classic Frontal Teaching Formats are in the Past – The Future Belongs to Research-Based Learning

1.1. Understanding oneself as a University of Applied Sciences

The following discussion focuses on "research-based learning" as a contribution to a paradigm shift in the higher education context of teaching-learning relationships between students and their teachers that currently appears to be

significant. Not only the degree programs associated with the Bologna Process change in comparison to the diploma degree programs. On the contrary, the demands on higher education pedagogy associated with digitization are also changing. In the narrower context of one of the key terms, didactics (gr.: διδάσκειν), people have dealt with it ever since advanced civilizations have existed - in other words, for at least six thousand years. The ancient Greek term didactics integrates both the side of the teachers (teach, instruct) and that of the learners (learn, be taught). As a core discipline of pedagogy, it deals with the theory of teaching at the metalevel and, as an applied science, with the creative transition of the same. The introductory part will now develop a didactic concept for the university's introductory module "Introduction to Scientific Work". At the end of the module, a seminar paper has to be written in the concrete case as proof of achievement in addition to a written exam. This often poses a great challenge to the first-semester students, as it is usually the first contact with the scientific structure of a work, the world of scientific publishing and, above all, with scientific methods. It should also be noted that the term "methodology" (gr: μεθοδολογία) already refers to a more fundamental character in its epistemological context than the term "methods": "The reflection of scientific methods and the research process in general is called methodology" (Döring& Bortz, 2016). This is much more complex and multidimensional in the interdisciplinary health sciences than it is in classical humanities and natural sciences. Radiological, biochemical, biophysical findings are just as implicit as the methods of empirical social sciences selected for the present context. Because this selection process is not self-evident in an interdisciplinary context, Klafki's important "Studies on Educational Theory and Didactics" (1974) was used for the selection process.

Table 1. Scheme of Didactic Analysis and Structural Planning Model (Kron 2008)

1. General Part	1. Historicality?
	2. Individual self-image?
	3. General sense?
	4. Structure of contents?
2. Special Part	I. Exemplary significance of educational content?
	II. Present importance?
	III. Future significance?
	IV. Educational goals?
	V. Favorable teaching and learning conditions?

Kron (2008) summarized the very comprehensive explanations in tabular form (Tab. 1.1).

The empirical social sciences have an immense importance in health sciences in the form of epidemiology. Against the background of the didactic analysis (here in particular point 2.III "Future significance", Tab. 1.1) this was already integrated in the revision of the subject "Introduction to scientific work" and with the inclusion of "Researchers' learning" within the framework of an experimental project in the first semester. Epidemiological studies increasingly no longer refer exclusively to morbidity and mortality trends - and thus to the primarily descriptive statistical evaluation of routine data. Since a purely quantitative approach no longer seems to be sufficient, in the context of epidemiological transition (Siegrist 2005) it is the epidemiology that increasingly has the task of recording questions and answers on health promotion, subjectively perceived quality of life, individual health competence, individual behavior and relationship prevention, and dealing with chronic disease progressions (Schaeffer, 2016) using alternative, interdisciplinary methods. For graduates of public health degree programs, this means that they will be able to apply methods independently and reflectively in the field of action after completing their studies in order to be able to use important decision-making bases for interventions.

While it was almost unthinkable until the 1970s to integrate quantitative and qualitative methods from the social sciences in terms of decision-making – e. g. within the framework of small-scale social space analyses – public health today presents epidemiology with tasks that exceed by far classical social science methods in the context of epidemiology: two examples are given here: the socio-scientifically empirical evaluation of the relevant construct for health reporting, "stress perception" as a conventional self-declaration questionnaire, now faces a biophysiological equivalent: biofeedback, which has been established since the 1980s. A second example: if wearables are activated with corresponding sensors to measure body values, these are much more valid than retrospectively oriented memory questionnaires, which are currently still being used. One thing, therefore, becomes instantly clear: traditional questionnaires and oral survey methods can, depending on the chosen sample and measurement method, be accompanied by risks of sometimes considerable errors. However, they can be implemented relatively cheaply in comparison to the alternatives mentioned here and, if carefully examined, do not contain any potential for ethical conflict. However, this is the case with the digital solutions mentioned. In addition to the significantly higher costs, they very quickly reach ethical and data protection limits. This

results in a conflict of objectives for which students should be prepared by an appropriate degree of methodological diversity within the framework of their studies. These didactic introductory reflections on research-based learning, guided by methodology, show one thing very clearly: the choice of methods must be made consciously; they represent a decision-making dimension in which students must be consciously involved. In the context of "learning to learn", the Canadian social psychologist Albert Bandura (1923) can therefore be supported, who formulates the following goal for the course of study:

> "A main objective of formal education is to equip the student with intellectual tools, self-confidence and self-regulatory skills so that he can continue learning independently throughout his life. The rapid pace of technological innovation and the ever-increasing demand for knowledge make self-directed learning indispensable" (Bandura 2007).

Since this should also apply to teaching in epidemiology, it is worth taking a first closer look at the didactics of research-based learning, which is closely linked to the concepts of self-directed and self-oriented learning (Schunk, 2012; Herold & Herold, 2011; Konrad & Traub, 2010).

At this point, a preliminary note on the integration of research-based learning shall be mentioned: regarding the introduction of bachelor's and master's degree programs, no fewer critics in the German-speaking world accused the new study format of "schooling" (Mieg, 2017). Whether this criticism is justified cannot yet be conclusively assessed. In an upcoming evaluation, however, it seems considerable how the ECTS system (ECTS = European Credit Transfer System) is structured: the basis for the calculation is that one ECTS point is compared to an equivalent of 30 working hours. While the study regulations for diploma degree programs provided for a review of academic performance exclusively by means of certifications, master's and bachelor's degree programs contain at least one further dimension: a proportion of structured self-study which supplements the attendance hours at the university - and which is also charged within the framework of the ECTS system. Here a large temporal dispositive can be recognized, which often remains relatively unused by lecturers and thus without consequences. As a rule, structured self-study means that the reception of compulsory and supplementary literature is reviewed only in written exams. Tasks in the context of research-based learning, however, remain largely unnoticed. This insight is by no means profane marginalia, but in the overall context of this contribution

rather a sad interim conclusion after about 10 years. To make it even clearer: with ECTS, the often-misunderstood Bologna Process does indeed provide framework conditions which should not only enable, but even promote research-based learning! On the contrary, however, the higher education landscape often lacks clever didactic approaches to using structured self-study in the sense of research-based learning within the individual modules or even across modules. This is an important finding as a framework condition for the solution to be presented, since self-directed and self-organized learning should be introduced as the basis for innovation.

First of all, it should be noted that research-based learning is not specifically assigned to any of the traditional pedagogical-psychological theory schools - the behaviorist, constructivist or even the social-cognitive perspective. Rather, it is the case that research-based learning can be placed in the context of many relevant schools of thought. In the higher education learning context, it must be emphasized that students experience research processes in their various phases, which must systematically build on one another.

In this context, universities of applied sciences should perhaps demonstrate an even stronger commitment to applied research in order to transfer this philosophy into teaching using their own examples. For these educational institutions, this means a self-confessed "yes" to empirical regularities and to applied demand research. This should not necessarily be equated with prejudiced downgrading, a much-discussed process in academic circles, as opposed to basic research universities. But what do students usually get from this elementary characteristic "research" in the setting of a University of Applied Sciences during the course of their studies? Little too much too little - this could be the provocative answer. Studying at a University of Applied Sciences is one of the demands of this article, which should in principle imply a focus on practical relevance, on the above-mentioned empirical regularities and on research needs; research-based learning should or must even be used in all modules in free interpretation of the above-mentioned Bandura quote, where this is possible.

1.2 Research Learning under the Paradigm of Applied Sciences

Research-based learning has its roots among other things in social psychology, in particular in the early phase of the American Kurt Lewin (1890–1947). The socio-psychological assumption generally focuses on interpersonal interaction. Lewin, as a pioneer of his "Action Research" approach, was

concerned with promoting democratic decision-making and the participation of practitioners in the research process. He himself succeeded in implementing the action research approach in cooperation with the Columbus University Teachers College, but no role-out took place. With the establishment of the social-cognitive learning theory, shaped by the already mentioned Canadian social psychologist Albert Bandura, it was possible to inspire further university and school circles for research-based learning. In Germany, this alternative teaching and learning format established itself from the 1960s onwards and was linked to the founding of several universities (including TU Dortmund and Bielefeld University). Of course, the thinking of the "1968 generation" also influenced this pressure to innovate. During the 1970s and 1980s, however, there were also deficits, which Mieg has clearly outlined (2017). According to this author, on the one hand, many lecturers used the phases of research-based learning of their students during courses to their own advantage. On the other hand, it was recognized that there was often a lack of clear process structures for research-based learning. Fig.1.1 presents in a graphic form how complex the procedural prerequisites for research-based learning are.

However, "Stations of teaching-learning process oriented towards research knowledge" and "Stations of teaching-learning process oriented towards the research process" are two parallel process paths that need to be integrated. This is generally a challenging task for the didactic conception of a course and even more for the "Introduction to Scientific Work" module in the first semester. Following Langemeyer (2017), the starting points for Process 1 are "Learning as comprehension" and for Process 2 "Learning as Development". The central goal of the first process path is "Knowledge as Reflection", while that of the second is "Knowledge as Anticipation". As far as this process-based listing of terms at the metalevel in the direction of further didactic operationalization in the university context is concerned, which is presented in Fig. 1.1, van der Donk et al. (2014) show in their Research Learning Cycle very successfully how this can be achieved. The module to be developed further in the course of this article has six lectures including four teaching units of 45 minutes each as a framework condition.
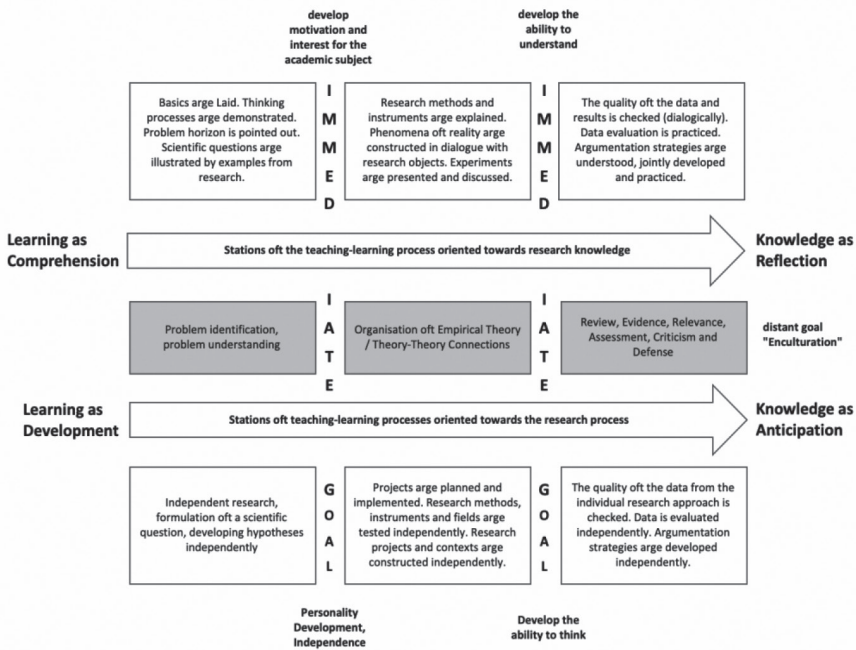
Fig. 1.1. Research oriented university courses as a process of enculturation (Langemeyer, 2017)
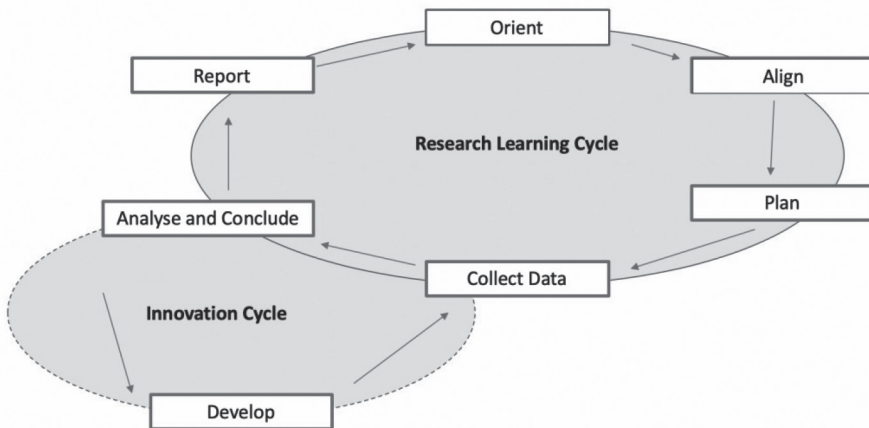

Fig. 1.2. Research Learning Cycle (Donk, Lanen, Wright, 2014)

In the monographic publication, the authors use their Research Learning Cycle to develop a system of milestones and sub-goals that can be

operationalized in a highly didactic way, consisting of six fields of work. Ideally, this can be supplemented by an Innovation Cycle in an inter-semester project. In the present case of the six lectures, each one is assigned to one of the main topics from the Research Learning Cycle.

In the context of research-based learning, it is now also worth taking a look at the smaller units of university didactic. In the present case, this concerns the structure of the four coupled teaching units. The question is how the structure of research-based learning differs from conventional courses. An answer to this question can be found by observing the ARIPE scheme (Fig. 1.3). In addition, this structure reveals the extent to which the role interpretation and self-image of the teachers changes at the lowest didactic conceptual level (university teaching unit with 45 minutes). While this was and still is the case, which is oriented in very narrow interpretation to the Latin term docēns (lat. for docēre: teach, teach), in research-based learning there is a need for situational arrangers with very deep and broad-based expertise in the subject of research.
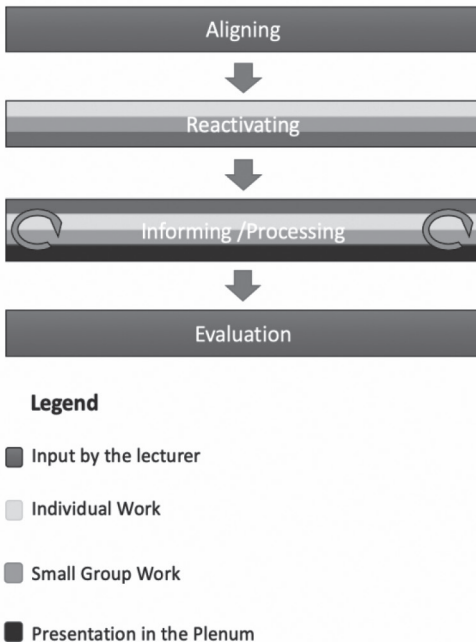
Fig. 1.3. The ARIPE Scheme

In the free interpretation of the phases "Aligning", "Reactivating" and "Evaluation", a rather heavily culled interpretation of didactic concepts can

be affiliated. At the latest, however, the phase "Informing/Processing" implies a possibly repetitive cycle of individual work, followed by a phase of work in small groups. This "heart" of research-based learning, conceived according to the ARIPE scheme, is concluded with a presentation of all results in the plenum.

Numerous didactic manuals available in German underline how varied and interesting the "Informing/Processing" phase design can be (Groß et al. 2012, Groß 2014, Knoll 2003, Rummer 2014).

From the didactic perspective, a well-estimated measure of innovative methods should be used during the "Informing/Processing" phase, which means that students should be able to positively evaluate the emotional sensations of manageability, comprehensibility, and meaningfulness. This means, above all, an average learning speed in this phase, frequent direct contact between teachers and the small groups, as well as the highest possible consistency within the learning groups over the total number of courses.

2. Social Epidemiology and Social Space Analyses as Decisive Thematic Anchors

Based on the didactic remarks on the "Why?" and "How?" of research-based learning, the second section of this article addresses the core question of "What"? In the course of several years, the authors of this article have reduced numerous aspects of the social-scientific-methodological requirement profile resulting from the module prerequisites in the sense of social-cognitive theory. In this context it is also possible to refer seamlessly to the German didactician Wolfgang Klafki (1974), who distinguishes between the exemplary and the elementary in the context of categorical education: the "Introduction to Scientific Work" is about understanding the principle of creating a scientific paper, applying it for the first time, and being able to transfer it to subsequent academic achievements. As an example, this is done in the module on the basis of a jointly developed main topic of social epidemiology. Epidemiology can generally be defined as "a branch of science [interpreted, n.f.a.] dealing with the distribution of diseases and their physical, chemical, psychological and social determinants, and consequences in the population" (Brüggemann, 2014). In addition, the authors narrow down social epidemiology as follows:

> "A branch of science that combines questions and methods from the social sciences and medical epidemiology. Goal: Clarification of health and dis-

ease-relevant questions, whereby beyond the biomedical model of traditional epidemiology, the relationships between society and health in particular are investigated" (ibid.).

Traditionally, social epidemiology uses empirical social research methods on the basis of a set of indicators too. Usually, these are not yet mastered by first-semester students and cannot be assumed either.

2.1. Social Epidemiology Interests among Public Health Students

As far as the interests of public health students are concerned, surveys on their motivation to study alone show that these covers, above all, topics and tasks that deal with social epidemiology. First of all, the interaction of social inequality, which has an effect on health, should be underlined (Lampert, 2016). The current generation of students seems to be aware of this connection due to the presently worsening situation (Hurrelmann& Albrecht, 2014). Many public health students consider it likely that their current comfortable living situation will change in the future, given the demographic development they consciously perceive. With regard to the healthcare system, they therefore assume that care will deteriorate. The perspective assessment leads to a different individual precautionary behavior than the one these students perceive in their personal environment. In turn, these impressions of peers in their own peer groups coincide with the findings of two current studies: firstly, the third "population-related health survey for children and adolescents ("KiGGS-Wave 2")" (Poethko-Müller et al. 2018). On the other hand, it deals with the results of the current DKV Health Report (German Health Insurance, 2018). According to both surveys, the current generation of students and pupils in compulsory education will suffer from chronic illness earlier due to their lifestyle – with a further increase in lifetime prognosis. Prior to this contemporary experience of one's own peer group, social inequality and the resulting rise in disparity are of concern to public health students, which means that a high degree of intrinsically motivated interest in knowledge can be reinforced with the first major topic area of social epidemiology.

The same applies to the assessment of environmental issues that students perceive on a daily basis in their everyday lives. The current generation of students and pupils is very ambivalent. While the majority of young people still seems to behave according to the principles of a throwaway society, the proportion of those who are worried about the future is increasing. The

currently world-famous initiator of the "Fridays for Future" wave, Greta Thunberg (2003) expresses these fears: "Why should I be studying for a future that soon may be no more, when no one is doing anything to save that future? (2019). In the course of their studies, public health students deal with environmental diseases if they are not already familiar with such pathogenic reactions to increased stress due to frequent previous professional experiences. Since the consequences of global climate change, emissions gas scandals and the use of toxic substances in agriculture are almost ubiquitous, with the escape hardly feasible, it can be assumed that a great interest in addressing related issues is intrinsically motivated.

A third and final point in this article, which speaks in favour of integrating social epidemiology into the "Introduction to Scientific Work" module, is that public health has a political claim. This was underlined in far more than just the action field "health in all policies" of the WHO Ottawa Charter for Health Promotion. Recent literary sources also emphasise this demand (Kickbusch& Buckett, 2010). At the local level, students experience health and social policy as "parliaments of the elderly" (Hurrelmann & Albrecht, 2014), as many reports by students in the course of the project on research-based learning show. In this respect, a supplementary look at the data handbook of the German Parliament (2018) reveals that the average age of members of parliament has been permanently over 49 years since 1994. Furthermore, the peak average age in the 4th parliamentary term (1961) was 52.3 years. In contrast to Austria, a country where the voting age is 16 and running for the office of a MP is also possible from that age, 2,367,951 voters* from the age cohort of Greta Thunberg are completely disregarded in Germany (StatistischesBundesamt, 2018). A side note: The youngest member of the current 19th parliamentary term of the German parliament was 24 years old at its constituent session. This impression is also confirmed at the local and regional level - the lifeworld of still strongly self-referentially oriented beginners - at the political level and at the implementation level of research-based learning at the reference location of Munich. Zick (2015) explains that the average age of the 33,000 people employed by the city administration is 45, with the addition that one third of these people will retire by 2025. According to the attributions of Hurrelmann and Albrecht (2014) to the generation of current students, who are involved in research-based learning, have hitherto been municipal institutions of health promotion and prevention: Within the context of "health in all policies", students

often report limited enthusiasm, inside-the-box-thinking between health and social policy, and a low degree of dynamism on the part of a large number of municipal employees. According to the reports, it is rather the voluntary civic commitment which develops innovative and cross-border solutions in the sense of "health in all policies" within the project framework. Poor spatial accessibility is often recognised in the context of primary prevention in order to describe the lack of "health in all policies" as a deficit.

In the overall context of this contribution, it should be noted, with regard to social epidemiology, that it can be didactically skillfully used and incorporated as a deflection roller. On a cognitive metalevel classic social epidemiological problems lead to the identification of deficits in one's own world on the basis of high intrinsic motivation to describe these and to develop solutions. The fact that this takes place in relation to one's own urban district serves as additional motivation. At the scientific level it is thus possible to develop an interest in research-based learning.

2.2. …but also Social Space Analyses

The term "social space", which has just been mentioned for the first time, is another elementary characteristic of the didactic implementation concept still to be presented in the "Introduction to Scientific Work" module. The social space became relevant to German sociology for the first time in the context of the "Marienthal Study", which was carried out in 1932. Lazarsfeld (2014) identified here an important "intersection" of several sociological currents, but, above all, the summary of statistics and the "introductory description of individual cases". Thus, at the latest, with this study on unemployment, the combination of quantitative and qualitative methods in the social space can be documented. This approach is now described as "mixed methods" and is established in the health sciences (Niederberger 2018, Schilling et al. 2015). At latest, since the WHO Charter of Ottawa (1986), the social space has gained outstanding relevance in the context of the setting approach. 23 years after the ratification of this basic document, the Hamburg-based social physician Alf Trojan (2009) will aptly call the district as the "mother of all settings". All five action fields of the Ottawa Charter for Health Promotion can be easily combined with this variant of social space:

- Development of a general health-promoting policy,
- Create health-promoting living environments,
- Promote health-related community action,

- Develop personal competencies and
- Reorienting health services.

When students explore their own social space on this basis, for the very first time they also follow structured, systematic and transparent scientific steps in their seminar paper. Concerning the "Discussion" part, they reflect implementation concepts and refer the Charter's action strategies from the aspect of their district. These are as follows:

- Health advocacy,
- Enabling and
- Mediation and networking (mediate).

In the period following the Ottawa Charter, the "rediscovery of the social space" (Riege& Schubert, 2014) was only due to its implementation in public health. The authors cite further reasons in a more sociological context: social urban renewal, youth welfare planning and the reorganization of social services. Furthermore, they complain that "recent publications on qualitative social research contain few or no contributions on empirical analyses of social spaces" (ibid.). Based on one of the most influential sociologists and social philosophers of the 20th century, Pierre F. Bourdieu, the didactic pre-consideration of the authors of this article was to build up according cognitive knowledge through the discovery of one's own social space by the means of emotional knowledge. Undeniably relevant steps of structuring, systematic and transparent procedure are to be linked this way via one's own life world. The so called "silent curriculum" of the "Introduction to Scientific Work" module includes "grasping the essence of what is experienced and seen on the spot, that is the most astonishing insights and most surprising experiences; their core". These can have their content "quite elsewhere" than it is expressed, e. g. by publicly available statistics (Bordieu 1979). In this context Tab. 1.2 shows how diverse the levels of investigation and objectives of a mixed method analysis are, with which the complex social structure of a district or a rural residential area should be recorded, in contrast to conventional epidemiological reporting.

Tab. 2. Levels of Investigation and Objectives of a Social Space Analysis that differentiating subspaces inwardly (Riege, Schubert, 2014)

	Levels of investigation	Aims
1	Space delimitation and space definition	Differentiation of significant social/physical subspaces of the urban areas
2	Structural profiling	Determination of patterns of socio-structural/socio-economic structures by subareas
3	Inventory description	Identification of existing problems/resources/potentials
4	Exploration of habitats and areas of use	In-depth field recording of subjectively and collectively constructed (perceptual) spaces

Social science methods derived from this can also be found in tab. 1.3. Many of the methods presented here are mentioned in the following subsection; these are applied by the students in the field test. This also implies that 24 teaching units of 45 minutes each represent a very narrow time window, in order to perform exemplary work on such an elementary topic as the preparation of a first seminar paper.

Tab. 3. Methodological Approaches to Social Space Analysis (Riege, Schubert 2014)

Survey context	Methods
Physical space delimitation and spatial definition	Zoning, mapping, urban image analysis, district history
Structural analyses by administration rooms	Statistical structural analyses, social indicators
Surveys in the study room	Narrative interviews, focused guideline discussions, group discussions, passer-by surveys
Systemic observations and surveys in the usage space	Participating observation, Burano-method, semiotic analysis (street reading), media document analysis, stakeholder analysis, network analysis, action research/activating survey, ethnographic-method
Survey of subjective usage aspects of the social space	Urban district exploration/inspection, action area analysis, life world analysis/needle method

The quantitative survey methods listed in Table 1.3 cannot be generated in their entirety in the form of primary data within the framework of the given time range. In the present case, this represents a possibility of interlocking with the second semester, in which the module "Quantitative Methods and Evaluation Research" is taught. This seems to be a special attraction, but also a challenge, since modular studies often run the risk of the content being patched together.

3. Students gain experience as young social epidemiologists

What is the pilot project about? First-semester students are to learn the elementary skills of scientific work in six courses of four teaching units each. The basic condition for this is that FOM students study part-time at a university of applied sciences: this can mean that students study either from Monday to Thursday on several evenings per week, or on two consecutive days of the week, alternating between these two time models on Friday evening and Saturday. These three study time models attract above all those who have already completed an apprenticeship/a placement and have initial work experience. In the present case, these are in bachelor's degree programs in:

- Health and Social management,
- Health Psychology & Medical Education and
- Social Work.

Most of them have previous professional experience in nursing (children, adult and geriatric) as social security employees, physiotherapists or social workers. A minority of them have a general matriculation standard, which means that there is a lack of prior experience regarding the work necessary for this level of education. For the majority of the students, the module "Introduction to Scientific Work" represents the first contact with the topic "Preparing an independent scientific document"; moreover, they shall do it at a significantly higher age than the one being the norm for students starting at the European qualification level 4 (general higher education entrance qualification). Many of them have an emotional connection of respect with the module right from the start, which in some cases even leads to fears of failure. This assessment is based on an initial survey of the authors in the context of each kick-off event (two to three courses during the current 11 semesters). As the first author left the topic of the seminar paper open for a total of eight semesters and taught the entire spectrum of quantitative and qualitative social science research in the form of frontal teaching according to the modular overall guidelines; the concept of research-based learning presented here has been practiced for three semesters now. This paradigm shift was induced as it had become quite clear in the last four years that students had already verbalized fears on an emotional level at the beginning of the course; partly with strong atmospheric effects on the further lectures of the module. In addition, the seminar papers were not prepared at a minimum level of what was academically acceptable

and required due to the excess content of the courses; thus, the general output quality before the switch to research-based learning left much to be desired. The consequence of this general constellation was that narrative texts on non-scientific themes were produced over a period of four years on the basis of the topics chosen by the students themselves; the social science methods were not applied to any extent in the majority of the papers submitted. The goal of developing the elementary through the exemplary could – this must be clearly stated – not be achieved in this constellation.

After the last three semesters, the didactic and content-related paradigm shift is to be described, which led both to a significantly increased output quality and to a more than significant reduction in the emotional attitude of the students. On the basis of the didactic change of concept, all effects of self-regulated and self-directed learning can be observed. The dynamic concept, which is still undergoing further development, has already been presented several times at scientific conferences and congresses.

3.1. Let's go – The Social Space Calls!

The switch to research-based learning was accompanied by a considerable reduction in the descriptive thematization of social science methods. On the other hand, the adaptation and integration of research learning cycles into the six courses was becoming more and more common. Fig. 1.4 shows how this took place: The didactic planning of the module was based on the structure diagram of small-scale social space analyses by Urban and Weiser (2006).

Within the framework of the opening event, which now has the title "Orientation", the first two teaching units introduce the "Introduction to Scientific Work" module. On the one hand, examination modalities and teaching contents are reflected here, and on the other hand expectations of the course and self-requirements are reflected. In addition, a first theoretical orientation regarding the social space takes place. In order to develop awareness for public health courses, the teaching impulse in the third teaching unit is fundamentally concerned with social and health inequality on the basis of Mielck's theory model (2005) (Fig. 1.5). The students spend the rest of the course researching the connection between social and health inequality in their own district first, subsequently presenting the results in a previously formed small group.
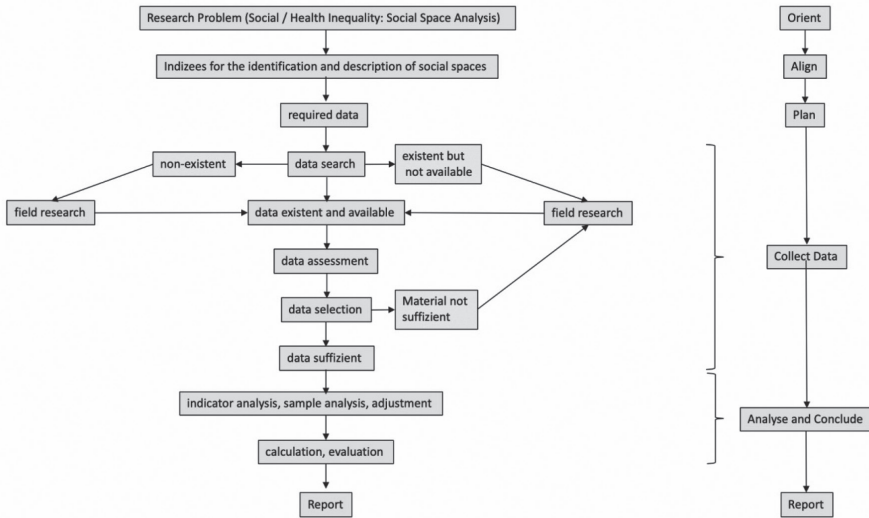
Fig. 1.4. Process of a small-scale social space analysis that considers the research learning cycle in a unidimensional way
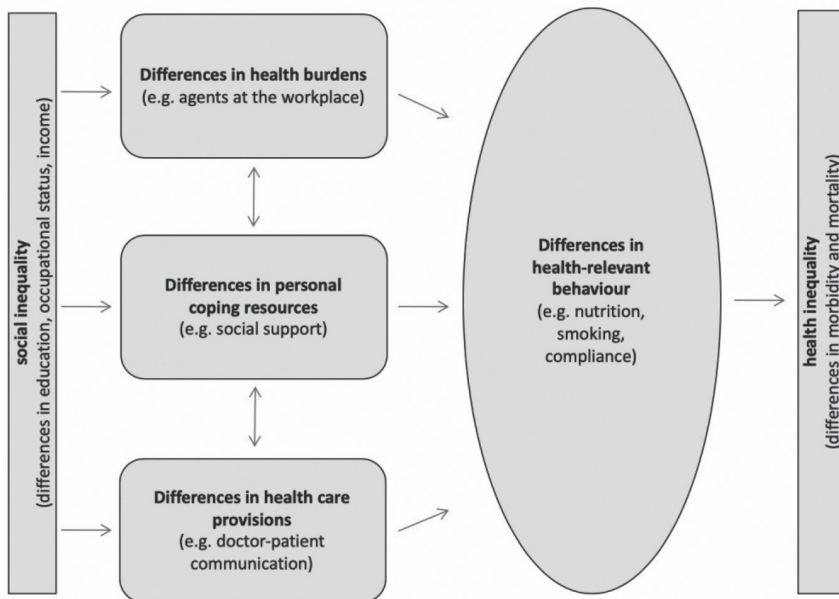
Fig. 1.5. Model for Explaining Health Inequalities

In the present case, the Bavarian capital Munich consists of 25 regulatory city districts, some of which are very different, even contradictory, as far as the facts described here are concerned. This is particularly noticeable in Munich's urban district 18, Untergiesing - Harlaching. As long as Untergiesing continues to be "characterized, above all, by its still recognizable character as a formerly typical working-class suburb with a simple and dense housing stock" (Landeshauptstadt München, 2019). This introductory description alone makes it clear that it is a demanding but motivating challenge for the students to grasp their own social space in all its contrasts within the framework of a seminar paper. Within the scope of the first course, the following aspects shall be addressed in terms of scientific work and thus on the metalevel: selecting a research object (social space), limiting it thematically according to given criteria (factors of inequality relevant to social epidemiology), linking it with a general literature search for the first time and, as a result of this process, presenting it to a small group. In the context of self-directed and self-organized learning, the homework is to work through the "Munich District Study" (Landeshauptstadt München, 2016) as basic secondary data material, and to extract and adequately secure the data necessary for one's own social space. The subsequent course, entitled "Aligning", focuses on three main areas. It starts with a small group work, in which the probable range of the own investigation is presented on the basis of the past research results. The results of self-directed learning must therefore be presented; experience has shown that not developing these tasks increases group-dynamic expectations such as "Hey, you should do that until next time". The results are presented to the plenum as an overview. It is essential in this section that the own results are linked to the model of social-health inequality. The second teaching unit, in the form of a teaching-learning discussion, consists of working out basic elements of a research goal and a research question and then deriving this in an exemplary way and in the same way for all students. Since it turned out to be too difficult from the point of view of the degree of abstraction, both are specified in the module by the lecturer: "The research objective is to analyze the health inequality resulting from social inequality on the basis of three categories (preventive health care, health care and quality of life) in the form of five guideline interviews, each with six questions, in one's own district". The research question derived is: "To what extent can the health inequality in Munich's district XY be proven by the triangulation of data sources and interviews?". The last two teaching units of

this course consist of searching digital search engines and specialist databases for relevant data sets on the basis of impulses from the teacher. It is essential to get acquainted with the differences between the two research instruments in order to be able to use them adequately in the future and to learn to document the hits accordingly. As homework for the second course, a first social room inspection must take place. The aim of these systemic observations and social-scientific methodologically guided surveys in the district is to carry out participatory observation, semiotic analyses (street reading), media document analyses, stakeholder analyses, network analyses and, if necessary, ethnographic methods.

At the beginning of the third course, "Planning", the results of the self-directed learning package are presented in small groups, compared and then presented to the plenum. The first lecturer impulse of the event refers to the selected model of social and health inequality. On the basis of this case study, the qualitative principles of the theories or theoretical models must have a novel character. In this model, the dimensions "differences in health burdens", "differences in personal coping resources" and "differences in health care" are replaced by "health care prevention", "health care in the district" and "subjective quality of life". On the basis of introductory explanations about the structure of guideline interviews, the learning groups are given supplementary keywords on the three dimensions so that they can continue working independently, on their own: the essential part of the second section of this course consists of developing two central questions to each of the three dimensions in the small learning groups across the districts. These will be written on cards and attached to pin boards later.

Finally, the students select a total of six questions for the guideline interview. The voting also takes place in small groups. On the metalevel of scientific work, the students learned in the third course to select and justify methods of data collection in order to draw up a theory-based research plan. The homework is about a further essential learning step, which has to be worked out self-oriented. The homework consists of writing a first, highly simplified research plan, containing the following four aspects, which must be reflected descriptively in writing:

- General requirements (reason for investigation, context, general conditions, integration of one's own social space analysis into other investigations identified within the research framework).

- Description of identified conflict potentials in the social space (results of literature research, conflict potentials, justification of the selected social-scientifically qualitative methods, reference of the social space to the model of social-health inequality).
- Transfer of research goal and research question to the selected social space.
- Specific planning of the "Survey" phase (Who should be questioned and why?).

The fourth course, "Survey", focuses on first practical field research experiences. Before this, the results of the homework (research plans) are discussed in small groups. In the sense of openness to results, the lecturer visits the learning groups and answers questions, but the results will not be collected and corrected due to self-orientation and control. Subsequently, the students go outside in order to find interview partners who will answer them to the questions. Since many students gain experience as interviewers for the first time in their lives, tandem or board interviews have proven to be constructive. In addition, the content of the key questions with regard to qualitative method-specific quality criteria (Mayring, 2016) can be reviewed once again in the wake of this small field research. The practical field research comprises two teaching units, which are always followed by a very active, dynamic and positive emotional compilation of the results, including their evaluation. At the end of the course, the students will have their guideline-supported questionnaire at their disposal and will be able to carry out the five guideline interviews required within the framework of the seminar work as a homework assignment in a self-organized manner, and then transcribe them until the fifth course.

The fifth and penultimate event of the module focuses on qualitative content analysis as an exemplary analytical instrument of empirical social research (Helfferich, 2011; Gläser&Laudel, 2010) under the title "Analyzing and drawing conclusions". This very important step in the implementation of the present didactic concept can only be carried out on the basis of the already transcribed and thus electronically available data. For this reason, a strongly shortened meeting of the small groups will take place during this event. What characterizes this teaching/learning unit, on the other hand, is the work on one's own text, the systematic and structured qualitative content analysis. They thus learn the compression of self-generated text material. This step takes up the first half of the course. The second half is then designed in a small

group framework: The aim here is to discursively draw conclusions from the compressed material. In specific terms, this means firstly: Which statements can be condensed in relation to the following three dimensions: "health care", "preventive health care" and "subjective quality of life"? And secondly: in what connection can the self-generated data be evaluated and interpreted with the otherwise researched data sources (e.g. Munich District Study, Health Reporting Bavaria)? Thirdly, based on the triangulated results which are being discussed in the small groups, a reference will be made by each student to the theoretical model of social-health inequality. The homework in this course is to begin with the systematic and structured writing of the results. This is done on the basis of a predefined template that indirectly reflects the research learning cycle. In the main part it includes the following subchapters:

- Detailed description of the research object and state of research
- Plausibility check of the research and investigation plan
- Results of literature research and original data
- Discussion
- Conclusion

The last course includes the preparation for the exam. This is a multiple-choice exam with a total of 30 closed items, each with four possible answers, which is written about two weeks after the last course. The second part of the course consists of a workshop in small groups, during which the results of the writing process will be presented and discussed.

3.2 First results of the action field and findings regarding the didactics

The evaluation of the findings is based on two different principles. The first is the transcripts of the second author, who simultaneously is the lecturer of the respective module within the framework of research-based learning. This will be supplemented by written and verbal comments of the students. Quality output constitutes the second principle; hereby particularly the seminar papers and not the second module achievement or the examinations should be considered.

It could have been observed during the courses that have been held so far in accordance with the research-based learning concept that the small group work led to intensive discussions via a clearly perceptible increase in dynamics. Especially courses three (development of key questions) and four (field test) led to changes in attitudes towards the module. For all six cohorts, this led to a degree of identification with the chosen research topic that could not be

established previously. The exchange about one's own interview experiences as a homework assignment in the fourth course contributed to this at the beginning of the fifth course; it was not only about self-directed learning, but even more so about experiential learning. The students also welcomed the fact that their partial results will be used within the framework of research at the FOM Institute for Health & Social Affairs. They feel appreciated and perceive their tasks with significantly increased awareness. However, it must also be noted that research-based learning entails an additional workload that should not be underestimated. During their practical experience, students seek the advice of their lecturers more frequently than in case of frontal didactics. Ultimately, it should also be mentioned that during all three semesters until now, experience has been gained leading to conceptual changes in the structure of the courses and will probably continue to do so.

In order to guarantee the objectivity of the evaluation process, an external evaluation and marking of the seminar papers has been carried out by one and the same person for three years (six semesters). On the basis of a comprehensive set of documents, she was asked to set up a comparative list of "Summary of expert findings before and after the shift to research-based learning". The results are as follows:

Before the shift:

- Works submitted were almost exclusively descriptive, mostly narrative.
- Many documents resembled experience essays.
- There was little interest and effort on the part of the reviewer to explore the subject scientifically. On the contrary, the seminar papers gave the impression that such an assignment is a great burden and its meaningfulness is not comprehensible. The assumption often arose that "something had to be sketched out quickly" in order to get rid of the unpleasant task as quickly as possible.
- This resulted in a somewhat massive problem for the expert with regard to marking: Since the seminar papers often did not meet the minimum requirements for a scientific paper, it was not only difficult to formulate at least some positive statements regarding a free commentary, rather, the marking of the work was generally difficult due to the overall performance.
- With regard to the "comprehensibility" and "manageability" dimension, the evaluator emphasized that the seminar papers conveyed the

impression of great uncertainty. The students seemed to have dealt with questions "What do I have to do at all?" and "How do I solve my tasks?"

- Ultimately, this led to the fact that this deficient quality of the results influenced the reviewer's motivation.

After the shift:

- No descriptive narrative work was submitted over these three semesters. Only original works were presented.
- The writing style of the submitted works indicates that they were created with much more commitment and effort.
- An interest in the topic "social space analysis of one's own district", and "social epidemiology" can also be recognized.
- The recognizable interest, commitment and effort are traceable from an expert's perspective to the fact that the seminar papers
  a) by choosing the topic "social space analysis", students are given a sense of meaning that implies a high affinity to the chosen studies.
  b) be perceived as a manageable task because the guideline interviews are developed together and the qualitative content analyses are developed in group work on the basis of the own case studies. In addition, the template provided in the framework of the research-based learning approach makes the orientation much easier and is used in almost all cases.
  c) the students, as the results show, seem to know what is important in the seminar work in terms of comprehensibility.
- All this ultimately led to a significant increase in the quality of the results. The evaluator emphasises that she, too, derives significantly more pleasure from taking on this responsible activity.

Abstract: Research-based learning is an outstanding and very demanding form of university education. Established teaching/learning formats have to be overcome, which begins with time-consuming didactic considerations of course planning, continues during the supervision of students during the semester and leads to a completely different interpretation of the role of teachers. On the basis of necessary didactic preliminary considerations for the realization of research-based learning in a higher

education context, the article introduces the concrete thematic implementation in the case study of the "Introduction to Scientific Work" module. In order to be able to reflect research-based learning under the paradigms of self-regulated and self-organized learning again and again, in team meetings at the horizontal level of the students, it proved to be useful to have a common topic to be worked on during the conception of the module. Due to the fact that all participants in the yet unfinished pilot project are studying one of the variants in the field of public health, initial experiences in a methodologically qualitative social space analysis appeared to be manageable. On the basis of some target group-oriented comments on social epidemiology, the contribution describes the scientific significance of social space. On this basis, the implementation of the didactics of research-based learning in six courses, each consisting of four teaching units of 45 minutes, is presented.

Keywords: Research-based learning, university didactics, social epidemiology, social space analysis, Munich

Streszczenie: Nauka oparta na badaniach naukowych jest wybitną i bardzo wymagającą formą edukacji uniwersyteckiej. Ugruntowane formaty nauczania/uczenia się muszą zostać przezwyciężone, co zaczyna się od czasochłonnych rozważań dydaktycznych nad planowaniem kursów i jest kontynuowane w trakcie nadzoru nad studentami w trakcie semestru i prowadzi do zupełnie innej interpretacji roli nauczycieli. Na podstawie niezbędnych wstępnych rozważań dydaktycznych dotyczących realizacji kształcenia opartego na badaniach naukowych w kontekście szkolnictwa wyższego, w artykule przedstawiono konkretną realizację tematyczną w studium przypadku modułu „Wprowadzenie do pracy naukowej". W celu odzwierciedlenia uczenia się opartego na badaniach naukowych w paradygmatach samoregulującego się i samoorganizującego uczenia się raz po raz, na spotkaniach zespołu na poziomie poziomym studentów, przydatne okazało się posiadanie wspólnego tematu, nad którym należy pracować w trakcie opracowywania koncepcji modułu. Z uwagi na fakt, że wszyscy uczestnicy nieukończonego jeszcze projektu pilotażowego badają jeden z możliwych wariantów w dziedzinie zdrowia publicznego, początkowe doświadczenia w metodologicznie jakościowej analizie przestrzeni społecznej okazały się możliwe do zrealizowania. Na podstawie niektórych uwag dotyczących epidemiologii społecznej, skierowanych do grup docelowych, wkład ten opisuje naukowe znaczenie przestrzeni społecznej. Na tej podstawie przedstawiono realizację dydaktyki uczenia się w oparciu o wyniki badań w sześciu kursach, z których każdy składa się z czterech 45-minutowych jednostek dydaktycznych.

Słowa kluczowe: Nauka oparta na badaniach naukowych, dydaktyka uniwersytecka, epidemiologia społeczna, analiza przestrzeni społecznej, Monachium

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