



Innovation and Practice in College Student Management under the Background of Strengthening Morality and Cultivating Talents

Naifa Gong^{a*}, Wei Zhao^b, Chao Liu^c, Yujie Gao^d, Jiyao Zhai^e, Lv Ji^f

Early Warning Academy, Wuhan, Hubei, 430019, China

^{a*}gong_naifa@foxmail.com, ^b149757086@qq.com
^c13277900707@163.com, ^d894516784@qq.com
^e1032402231@qq.com, ^f601947489@qq.com

Abstract. This article explores innovative student management in automobile repair majors by integrating moral education with the PDCA cycle and humanized management. It proposes a "PDCA+humanized" dual-spiral system, incorporating professional ethics and safety norms through school-enterprise collaboration. Using rooted theory and participatory observation, the study employs measures like professional ability matrices and master-apprentice pairings to enhance core literacy. Results show improved student professionalism, safety awareness, and skills, while reducing training costs and boosting corporate satisfaction. Challenges, such as ensuring tutor participation and meeting personalized needs, are noted, with suggestions for future optimization. The study offers theoretical and practical insights for vocational education management reform.

Keywords: Moral education, PDCA cycle, humanized management, automotive repair major, industry education integration

1 Introduction

Against the strategic background of the great rejuvenation of the Chinese nation, vocational education, as a key force supporting the transformation and upgrading of the real economy, is undergoing profound changes [1]. As the fundamental task of education in the new era, moral education has been given unique connotations in the field of vocational education. It is not only the core requirement of moral education, but also the value guidance for improving the quality of technical and skilled talents [2][3]. As an important support for the modern manufacturing service system, the quality of its talent training is directly related to the success or failure of the transformation and upgrading of the automobile industry. The innovation of the student management model of this major has become a key breakthrough in solving the structural contradictions in the supply of technical and skilled talents [4].

At present, vocational education is facing unprecedented challenges and opportunities. On the one hand, the society has a growing demand for high-quality technical and

skilled talents. As a technology-intensive field, the automobile repair industry has put forward higher requirements for the professional qualities, professional skills and innovative abilities of practitioners [5]. On the other hand, the traditional management model of vocational education is no longer able to adapt to the development needs of the new era. Especially in the automotive repair major, problems such as insufficient professional identity, weak awareness of safety norms, and low efficiency of school-enterprise collaborative management are becoming increasingly prominent [6]. These problems not only restrict the cultivation of students' core literacy, but also affect the ability of vocational education to upgrade the industry.

The real dilemma of student management in automotive repair majors has multiple complexities. The career identity crisis is manifested in the fact that some students are affected by social prejudice, lack of deep understanding of professional values, and their career development planning is vague [7]. The weak awareness of safety norms is reflected in frequent violations during the training process, and the high tool damage rate is high, reflecting the disconnect between safety education and behavior development [8]. Under the background of industry-education integration, the school-enterprise collaborative education mechanism has not yet been improved, and the depth and effectiveness of enterprise participation in management are insufficient, resulting in a gap between talent training and industrial demand. In addition, the unique psychological characteristics and behavioral patterns of the post-00s student group, such as strong self-awareness, diverse information reception, and perceptual value judgments, pose challenges to the traditional rigid management model, and it is urgent to build a more humane management paradigm [9].

Faced with these challenges, innovation in vocational education management models is imperative. As a scientific management method, PDCA cycle emphasizes the closed-loop management logic of goal setting, process monitoring, quality diagnosis and continuous improvement, providing methodological support for improving management efficiency [10][11]. The humanized management concept focuses on individual needs, emotional incentives and potential development, which helps to make up for the shortcomings of the rigid management model [12]. Integrating the two to build a management system that not only conforms to technical specifications but also demonstrates humanistic care has become an important direction for management innovation for students in automobile repair majors.

This study aims to explore the integration path between PDCA cycle and humanized management, and use the automotive repair major as a practical carrier to build an educational chain of "standardized development - skill improvement - value recognition". Through in-depth cooperation between schools and enterprises, core literacy such as professional ethics, safety norms, and professional psychology will be included in the entire management chain, forming a goal-oriented, process optimization, and continuous improvement management closed loop. The research adopts rooted theory, enterprise participatory observation and practical training process evaluation methods, deeply analyzes key issues in management practice, and refines innovative models with promotional value.

This study is based on the forefront of vocational education reform, responds to the times's propositions of cultivating core literacy of technical and skilled talents, and integrates management scientific theories and educational humanistic concepts. It not only has theoretical innovation value, but will also provide new solutions for vocational education management practice. Through the coupling effect of dynamic optimization of management processes and deepening humanistic care, it is expected to build a new vocational education management model with Chinese characteristics, providing solid talent support for the transformation and upgrading of the automobile industry and the high-quality development of the real economy.

2 Theoretical Basis and Literature Review

2.1 Professional Extension of Moral Education and Human Connotation

As the fundamental task of education in the new era, cultivating morality and educating people has shown a unique professional extension path in the field of vocational education. This extension is not only reflected in the infiltration of values in the process of technical skills imparting, but also in the deep integration of professional ethics and safety normative education. As a technology-intensive service field, the automotive repair major is essentially a process of forging professional spirit. Research shows that integrating the concept of "ideological and political courses in courses" into the automotive maintenance training, deconstructing the technical details in the engine maintenance process, and simultaneously conveying the craftsman spirit of striving for excellence and the safety concept of life first, can form a three-in-one educational effect of "hand, brain, and heart".

This professional extension is typical of German dual education. A follow-up study by the Technical University of Munich shows that the auto repair major that adopts the "ethics-technology dual penetration" model has a 37% increase in the professional identity index of graduates compared with the traditional model, and the implementation rate of the safety-3 standard remains above 92%. The mechanism is that through the demonstration teaching of corporate tutors and the theoretical guidance of school teachers, a three-dimensional cognitive framework of "vocational belief-technical standards-safety specifications" is built, so that students can deeply understand the humanistic care behind each technical parameter while mastering the usage standards of torque wrench. This educational model provides an important reference for solving the problems of insufficient professional identity and weak awareness of safety norms in vocational education in my country.

2.2 Vocational Education Adaptation of PDCA Circulation

As the core tool of total quality management, PDCA cycle has shown unique adaptability advantages in the field of vocational education. Its closed-loop logic of "plan-execution-processing" forms a natural fit with the stage characteristics of automotive repair training teaching. In the practical training teaching scenario, the P (planning)

stage corresponds to the construction of the professional ability matrix, the D (execution) stage focuses on the implementation of project-based teaching, the C (inspection) stage relies on OBE results-oriented evaluation, and the A (processing) stage realizes iterative upgrade of the training model. This closed-loop quality effectively solves the problem of fragmented traditional training management

2.3 The Direction of Training of Technical Skills Talents in Humanized Management

The introduction of humanized management in vocational education marks the transformation of the paradigm for cultivating technical and skilled talents. Self-determination theory reveals that when an individual perceives autonomy and competency in practical training, he or she will have stronger intrinsic motivation. Emotional labor theory further points out that emotional support in the master-apprentice relationship can significantly improve the professional resilience of apprentices. In the automotive repair major, this management concept is transformed into innovative practices such as "emotion-perceptual master-apprentice pairing" [13].

2.4 Research Review

Although the existing research on vocational education management has made progress at the application level of a single theory, there are obvious practical gaps. Most achievements may focus on the technical rationality of PDCA and ignore the value dimension of humanized management; or emphasize emotional incentives and weaken the cultivation of technical accuracy. This either-or research orientation has led to a bottleneck in improving management efficiency. This study innovatively proposes the "PDCA+humanized double helix structure model", organically integrates technical rationality and value care, and builds a closed-loop education of "standardization development-skill improvement-value recognition".

This model breaks through the traditional research paradigm and develops a professional ability matrix through joint development of a school-enterprise, and incorporates core literacy such as professional ethics, safety norms, and professional psychology into the entire management chain. During the training process, PDCA cycle is used to ensure the accurate execution of technical parameters, and humanized intervention is implemented through professional psychological dynamic monitoring. This innovation not only responds to the actual needs of integration of industry and education, but also provides solutions with Chinese characteristics for the modernization of the vocational education governance system.

3 Double Helix Coupling Between PDCA cycle and Humanized Management

The core of vocational education management innovation lies in building a education mechanism that combines hardness and softness. This study creatively proposes the

"fourth-order coupled design model" by deconstructing the technical rationality of the PDCA cycle and the value care of humanized management, and implants the DNA of moral education into the entire chain of practical training management. This model breaks through the binary opposition of the traditional management paradigm and regards the development of professional ability as a double leap process of technical specifications and psychological growth.

3.1 Fourth-Order Coupling Design

In the fourth-order coupling design, each stage of the PDCA cycle becomes the carrier of humanized management, and the specific content is shown in Table 1.

Table 1. Implementation Contents of Fourth Order Coupling Design

Stage	PDCA core mission	Humanized management embedding points
P	Schools and enterprises jointly formulate professional ability matrix	Professional personality test and personalized growth plan design
D	Practical training project-based teaching implementation	Emotion-aware master-apprentice pairing and fault-tolerant incentive mechanism
C	OBE achievement-oriented multi-dimensional evaluation	Dynamic monitoring and intervention of occupational psychological toughness
A	Industry standard iteration and training model upgrade	Career growth file tracking and lifelong development support

The planning stage (P) transcends traditional curriculum development and establishes a dual-driven professional ability matrix of schools and enterprises, covering three dimensions: professional ethics, safety norms, and technical accuracy. Through professional personality tests, a digital portrait of students is established and a "craftsman spirit cultivation path map" is customized for each student, so that the training goals not only reflect industry standards but also highlight individual development demands.

Innovate project-based teaching models in the execution stage (D) and establish an "emotion-perceptual master-apprentice pairing" mechanism. Corporate mentors use intelligent emotion recognition devices to capture apprentice psychological fluctuations in real time, and the system automatically triggers incentive plans. During the engine disassembly and assembly training, when students are monitored to experience anxiety due to multiple failures, the system immediately pushes a three-dimensional simulation disassembly animation, and the instructor intervenes simultaneously for psychological counseling. This fault-tolerant incentive mechanism effectively improves the effectiveness of practical training.

The inspection stage (C) constructs a multi-dimensional evaluation system that is oriented towards OBE results and develops a dynamic monitoring cloud map of occupational psychological toughness. Through three-dimensional feedback such as image

analysis and customer simulation evaluation during the training process, not only can the degree of technical parameters be evaluated, but also the psychological stability in the implementation of safety and specifications, forming a comprehensive diagnosis of career growth status.

The improvement stage (A) establishes an iteration of industry standards and lifelong development support mechanism to create a "Digital Archive of Autobot Career Growth". Schools and enterprises jointly build a technology evolution model, transform new industry standards into practical training modules, and provide lifelong professional skills upgrade services to every student to form a sustainable ecosystem for professional ability development.

3.2 Implementation Principles

Research and establish the three principles of "hardness and softness complement each other, skill and way to practice dual cultivation, and dual governance". The principle of unity of safety standard rigidity and humanistic care flexibility is realized through the "Safety Points Visualization System": students generate dynamic QR codes instantly every time they operate, and scan the code to view the growth trajectory of safety behavior, which not only strengthens normative awareness, but also stimulates motivation for achievement.

The principle of combining technical skills accuracy and professional spirit temperature has been verified in the "Auto Hospital" entrepreneurial incubation project. In real customer service, the student team not only cultivates fault diagnosis technology, but also cultivates the spirit of service craftsmanship, realizing the integration of technical rationality and value care.

The principle of complementary evaluation of corporate mentors and school-based management is implemented through the school-enterprise rotating management consultation system. A joint meeting on dual education is held every month to simultaneously update the training projects and evaluation standards, so as to deeply improve the integration of industry and education, and form a long-term mechanism for school-enterprise collaborative education.

This kind of innovation in the integration mechanism is essentially an iterative upgrade of the vocational education management paradigm. It breaks through the technical tool attributes of the traditional PDCA cycle, transforms humanized management into an endogenous variable for quality improvement, and builds a closed loop of education of "standardized development - skill improvement - value recognition". This model not only provides a management paradigm for the automotive repair major, but also opens up a new path for the modernization of the vocational education governance system in the new era.

4 Practical Exploration and Case Analysis

This study uses the "three-dimensional fusion management model" as the framework and builds a three-dimensional practice system of "double integral drive-scene immersion-digital portrait" in the automotive repair major. Through the dual-track advancement of strategic innovation and typical practice, the technical logic of the PDCA cycle and the value care of humanized management are embodied into an operational educational plan.

4.1 PDCA Dual-Track Education Innovation System

During the Plan stage, the "auto maintenance professional ethics + safety standards" double-point system was innovatively developed. Break through the traditional moral education scoring model and establish three-dimensional evaluation indicators including "professional commitment fulfillment", "safe operation innovation" and "craftsman spirit explanatory". Students generate professional ethics digital portraits through role-playing, and the safety standards points are dynamically bound to the permissions of practical training equipment.

In the Do stage, the "enterprise mentor training + student innovation workshop" hybrid management model will be implemented. Corporate mentors bring real fault cases to campus every week, and students' innovation workshops set up practical modules such as "fault diagnosis and treatment arena" and "technical improvement proposals".

The Check stage is to build a three-dimensional feedback system for "image analysis of practical training process + customer simulation evaluation". Develop an intelligent training analysis platform to automatically capture 27 typical behaviors during the training process through AI visual recognition technology, and generate a "career competency radar map" in combination with the customer simulation evaluation system.

The Act stage will implement the "National Competition Standard Reverse" curriculum reform and the "Craftsman Spirit Month" brand activity. The technical standards of the National Vocational College Skills Competition are deconstructed into modular courses, and digital resource packages such as "high-voltage electrical safety standard virtual simulation system" are developed. During the Craftsman's June Spiritual Month activity, students achieved concrete cultivation of professional spirit through the forms of "Creating Auto Doctor Situation Drama" and "Ethical Debate on Maintenance Cases".

4.2 Scenario-based Implementation of Management Innovation

In the practical exploration of management innovation, we selected several typical scenarios for in-depth implementation to verify the effectiveness of the "PDCA+humanized" double helix education system.

Taking the maintenance and training of new energy vehicles as an example, we have established an intervention mechanism of "VR simulation rehearsal + safety points visualization". Students perform high-voltage electrical homework rehearsals in the virtual simulation system, and accumulate safety points through multiple error-free operations.

Only when a certain amount of points can they obtain practical training permissions. This mechanism not only improves students' awareness of safety norms, but also displays safety points in real time through electronic industrial cards, forming a healthy competitive atmosphere among peers.

In terms of poor student management, we have innovatively implemented the "Toolkit Assistance Program" of "Anonymous Application System + Tool Maintenance Responsibility Contracting". Poor students anonymously apply for professional tool kits through campus platforms and assume the responsibility for tool maintenance. At the same time, we have established a "Tool Life Archive" tracking system to record the flow trajectory and maintenance of tools, which not only solves the practical difficulties of poor students, but also cultivates their sense of responsibility and team spirit.

These typical practices not only verify the effectiveness of the integration of PDCA cycle and humanized management, but also build a comprehensive educational closed loop of "technical norms-psychological growth-value recognition" through the endogenous driving of professional norms, the infiltration and cultivation of real scenes, and the dynamic feedback of digital portraits, providing valuable experience and inspiration for management innovation in the automotive repair major and even the entire vocational education field.

5 Efficacy Assessment and Challenges

Through one-year practical exploration, this study has built a "PDCA+humanized" double helix education system in the automotive repair major. The system has achieved remarkable results in improving the core professional literacy, deepening the integration of industry and education, and innovating management models. It also exposed structural challenges in the practice process and provided a clear direction for continuous optimization.

5.1 Student Feedback

In the past year of implementation of this study, students of automobile repair majors have made significant progress under the "PDCA+humanized" double helix education system. Student feedback shows that the satisfaction with the implementation and supervision of safety standards during the training process is as high as 89%, and it is believed that the school-enterprise collaborative education mechanism accounts for 86% of students who have helped a lot of learning, and the satisfaction with the school's performance in professional ethics education and humanized management systems is both more than 90%. Teacher evaluation pointed out that students' moral cultivation has been significantly improved and practical guidance has been enhanced in a targeted manner, but the participation of corporate tutors needs to be institutionalized. The assessment results show that the rate of obtaining students' vocational skills certificates has increased significantly to 89%, the damage rate of training tools has decreased by 37%, and the company's satisfaction score has increased by 15 points. The assessment results of major courses have been improved, indicating that students' comprehensive

quality and professional skills have been comprehensively enhanced. Overall, this study effectively promoted the cultivation of students' core literacy and provided useful exploration for innovation in vocational education management. The survey results are shown in Table 2.

5.2 Teacher Evaluation

According to teachers' feedback, our school has achieved remarkable results in management innovation practice in the context of "cultivating morality and cultivating people", but there is also room for improvement. Most teachers recognize the exploration of combining the concept of "three-dimensional education" with daily management, and believe that through measures such as building teachers' ethics and style, ideological and political reform of courses, students' moral cultivation has been improved. Some teachers pointed out that the school-enterprise collaborative education mechanism has enhanced the pertinence of practical guidance, but the participation of enterprise tutors needs to be further institutionalized. In addition, teachers recommend optimizing the evaluation mechanism of the "emotion-perceptual master-apprentice pairing" model, strengthening process assessment and personalized feedback to improve the effectiveness of education. At the same time, young teachers reported that moral education training resources were insufficient and needed to strengthen case teaching and practical guidance. Overall, the teacher group has a positive attitude towards management innovation, but it needs to continue to improve in resource integration, institutional guarantees and teacher training to better achieve the deep integration of moral education goals and management practices.

Table 2. Questionnaire Satisfaction Results

No.	Investigate the issue	Satisfaction
1	Are you satisfied with the implementation and supervision of safety regulations during the training process	89%
2	Do you think the school-enterprise collaborative education mechanism will be of great help to your study	86%
3	Are you satisfied with the school's performance in professional ethics education	98%
4	Are you satisfied with the implementation of the humanized management system of "emotional perception master-apprentice pairing"	90%
5	Do you think the training resources and equipment provided by the school can meet your learning needs	95%
6	Are you satisfied with the school's efforts to improve its core professional literacy	90%

5.3 Feedback of Assessment Results

compared and analyzed the data of 2024 freshmen and 2023 freshmen in vocational skills acquisition, training cost control, and corporate satisfaction. The results show that

when the number of people, age, equipment and other conditions are basically consistent, through the implementation of the "double points system" and "fourth-order coupling" mechanism, the student's professional skills certificate acquisition rate has achieved a significant increase, jumping from 63% to 89%. This significant increase reflects significant progress in students' professional skills mastery. At the same time, the damage rate of training tools has dropped significantly, down 37%, which directly led to a reduction in training costs, specifically 18%.

In addition, the company's satisfaction score for students has also increased significantly, reaching 91 points (a percentage system), an increase of 15 points from before the reform. Among the various dimensions of improvement in satisfaction, "safety and standardized execution" and "occupational stability" are particularly prominent, which fully demonstrates the effectiveness and practicality of this study in management innovation and practice.

The comparison of assessment results of major courses further verifies the comprehensive improvement of management innovation practice on students' comprehensive quality and professional skills. Specific results are shown in Table 3.

Table 3. Comparison of main course average scores between grade 2023 and 2024

No.	Course Name	Average results for 2023	Average results for 2024
1	Vehicle maintenance	76.5	81
2	Engine mechanism construction	78.9	80.2
3	Vehicle electrical	79	79.9

It can be seen from the table that students' average grades in each course have improved, especially in the two core courses of automobile maintenance and engine construction, the grade improvement is particularly obvious. This shows that through the implementation of the "PDCA+humanized" double helix education system, students' professional knowledge and skills have been comprehensively improved.

5.4 Implementing Challenges

In the practice of promoting the "PDCA+humanization" double helix education system, we have also encountered some implementation problems and challenges. Although the participation of corporate tutors has significantly enhanced the practicality and pertinence of practical training teaching, how to ensure the continuous and effective participation of corporate tutors, and how to balance the responsibilities and rights between corporate tutors and school teachers has become an urgent problem. At present, the participation of corporate mentors still lacks an institutional guarantee mechanism, which to a certain extent affects the depth and breadth of school-enterprise collaborative education.

With the increasing personalized needs of students, how to better meet the different development needs of each student has become another challenge. Although we have tried to customize personalized growth plans through professional personality tests and

student digital portraits, in actual operations, how to accurately grasp the changes in students' needs and timely adjust teaching strategies is still a process that requires continuous exploration and improvement.

At the same time, the limitation of training resources is also an important factor restricting management innovation practice. With the expansion of student scale and the increase in training programs, the tension in training equipment and venues is becoming increasingly prominent. How to maximize the effectiveness of practical training and improve resource utilization efficiency under limited resource conditions is a question we need to think deeply about.

How to maintain synchronization with the development of the times in management innovation practice is also an important challenge. With the continuous progress of technology and the continuous upgrading of industries, the management model and educational concept of vocational education also need to be continuously updated and improved. Therefore, we need to continue to pay attention to industry trends and technological development trends, and timely adjust and optimize management strategies to ensure the effectiveness and foresight of the education system.

6 Conclusion

This study developed a "PDCA+humanized" dual-spiral education system for student management in automotive repair majors, integrating moral education with technical training. Results showed significant improvements in students' professional skills certification rates (rising to 89%), safety awareness, and corporate satisfaction (up 15 points), while reducing training tool damage by 37%. Challenges included ensuring corporate tutor participation, meeting personalized student needs, and optimizing resource allocation. Future work will focus on strengthening school-enterprise collaboration, refining personalized education strategies, and adapting management models to industry advancements. The study provides a practical framework for vocational education reform, supporting talent development in the automotive sector.

Reference

1. Xia C F. Curriculum reform and practice of "agricultural machinery electrical control and PLC" under the background of modern vocational education [j]. Southern agricultural machinery, 2025, 56 (07): 180-183+187
2. Wang H W. Analysis on the teaching reform of basketball course in traditional Chinese medicine colleges and universities from the perspective of Ideological and political education [j/ol]. traditional Chinese medicine education, 1-11 [2025-04-14] <http://kns.cnki.net/kcms/detail/11.1349.R.20250411.1101.004.html>.
3. Qi Z Y. The overseas experience and Enlightenment of the implementation of the duties of moral cultivation of University Graduate supervisors [j]. graduate education research, 2025, (02): 100-108. DOI:10.19834/j.cnki.yjsjy2011.2025.02.11.
4. Min Q D. Challenges and Countermeasures of new energy vehicles to traditional automobile repair enterprises [j]. Journal of Liaoning Provincial Communications College, 2024, 26 (06): 35-38.

5. Li S. Thoughts on deepening the construction and development of vehicle maintenance technology [j]. Journal of military transportation, 2022, 1 (03): 59-62.
6. Zhang Y M. Research on "action oriented" education and teaching under the teaching reform of automotive major in secondary vocational schools [j]. use and maintenance of agricultural machinery, 2022, (06): 148-150. DOI:10.14031/j.cnki.njwx.2022.06.048.
7. Ran Y F. Master identity in enterprises' participation in modern apprenticeship: type analysis and path construction [j]. Journal of East China Normal University (EDUCATION SCIENCE EDITION), 2025, 43 (04): 104-115. doi:10.16382/j.cnki.1000-5560.2025.04.008
8. Gao X C. Equipment overhaul and maintenance measures during vehicle repair [j]. special purpose vehicles, 2023, (09): 112-114. DOI:10.19999/j.cnki.1004-0226.2023.09.034.
9. Zhang C F. An analysis of the group characteristics and management strategies of "Post-00" students in Higher Vocational Colleges [j]. science, education and culture collection (the last ten days issue), 2020, (34): 160-161. DOI:10.16871/j.cnki.kjwha.2020.12.068.
10. Diogo C ,João M L ,Leonor T . A framework to guide and support the design of a smart city based on the PDCA cycle approach [J]. Journal of Systems and Information Technology, 2025, 27 (1): 65-93.
11. Naughton E ,Moran R ,Kharub M , et al. A structured model for continuous improvement methodology deployment and sustainment: A case study [J]. Heliyon, 2024, 10 (21): e40034-e40034.
12. Barros A ,Bristow A ,Contu A , et al. Politicizing and humanizing management learning and education with Paulo Freire [J]. Management Learning, 2024, 55 (1): 3-16.
13. Gong N F. Analysis and Research on the Current Situation of Training Pre-selected Sergeant Personnel[C]// School of Journalism and new media, Xi'an Jiaotong University. Proceedings of 3rd International Conference on New Media Development and Modernized Education. Air Force Early Warning Academy,, 2023: 69-76. DOI:10.26914/c.cnkihy.2023.123592.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

