

ABSTRAK

Fransidha Sidhara Hadi, 081414030, 2012. *Pedagogical Content Knowledge (PCK) Guru Matematika di SMA Negeri 1 Klaten terkait Pengetahuan Guru tentang Konsepsi dan Miskonsepsi yang Dimiliki oleh Siswa dalam Pembelajaran Materi Fungsi Naik, Fungsi Turun, dan Titik Stasioner. Skripsi. Program Studi Pendidikan Matematika, Jurusan Pendidikan Matematika dan Ilmu Pengetahuan Alam, Fakultas Keguruan dan Ilmu Pendidikan, Universitas Sanata Dharma, Yogyakarta.*

Penelitian dalam skripsi ini bertujuan untuk mengungkap pengetahuan guru terkait pengetahuan guru tentang konsepsi dan miskonsepsi siswa dalam pembelajaran matematika di SMA Negeri 1 Klaten.

Penelitian ini merupakan penelitian kualitatif deskriptif. Subjek penelitian adalah guru matematika kelas XI IPA 2 SMA N 1 Klaten dalam pembelajaran Kompetensi Dasar 3.4: Menggunakan turunan untuk menentukan karakteristik suatu fungsi aljabar dan memecahkan masalah dengan materi pokok Turunan dan sub-pokok materi Fungsi Naik, Fungsi Turun, dan Titik Stasioner. Pengumpulan data dilakukan dengan wawancara dengan guru dan siswa, serta observasi proses pembelajaran di kelas yang direkam dalam bentuk video. Analisis data dilakukan dengan langkah-langkah, yaitu : (i) transkripsi data, (ii) reduksi data, (iii) kategorisasi data, (iv) penarikan kesimpulan.

Hasil penelitian berupa *PCK* guru matematika terkait konsepsi dan miskonsepsi siswa dalam pembelajaran Fungsi Naik, Fungsi Turun, dan Titik Stasioner. *PCK* dalam penelitian ini terwujud dalam pengetahuan guru terkait konsepsi dan miskonsepsi siswa dalam pembelajaran materi Fungsi Naik, Fungsi Turun, dan Titik Stasioner. Guru memiliki pengetahuan tentang mana saja bagian materi yang dimengerti dengan baik dan tidak dimengerti dengan baik oleh siswa. Melalui analisis pengenalan guru terhadap siswanya diperoleh kesimpulan bahwa guru cenderung mengenali siswa-siswinya dan melihat situasi kelas secara global, beberapa siswa yang dikenali dengan baik adalah siswa-siswi yang tergolong aktif dalam pembelajaran. Guru memperoleh pengetahuan mengenai siswanya kebanyakan ketika proses pembelajaran berlangsung, sebagian melalui rekan guru lain, dan selain itu guru mengenali konsepsi siswa ketika mengoreksi ulangan/test siswa.

PCK guru tentang konsepsi siswa yang tergolong mantap antara lain adalah pengetahuan guru bahwa : (i) semua siswa sudah mampu menentukan turunan fungsi; (ii) semua siswa mampu menentukan syarat fungsi naik ($f'(x) > 0$), fungsi turun ($f'(x) < 0$); (iii) ada siswa yang mampu mengenali bahwa sifat-sifat/ karakteristik suatu fungsi dapat ditentukan melalui turunan, tidak ada siswa yang sangat kurang dalam mengerti bahwa titik stasioner memiliki syarat $f'(x) = 0$, tidak ada siswa yang sangat kurang dalam menentukan titik koordinat stasioner dengan benar, semua siswa sudah tahu tentang menguji titik stasioner dengan turunan pertama ataupun kedua untuk diketahui jenisnya meski terkendala pada prosedur hitungan; (iv) ada siswa yang sempat keliru dalam menyebut titik ekstrim; (v) semua siswa sudah mengerti syarat titik belok yaitu $f''(x) = 0$; guru mengetahui ada hal yang belum dipahami tentang titik belok; (vi) semua siswa sudah bisa menggambar grafik.

PCK guru tentang konsepsi siswa yang tidak mantap antara lain adalah pengetahuan guru bahwa : (i) semua siswa sudah mengerti dengan baik bahwa titik stasioner bisa berupa titik ekstrim, hanya ada satu dua siswa yang bisa memahami definisi formal pengertian titik maksimum dan minimum.

Guru juga memiliki pengetahuan tentang miskonsepsi siswa. PCK guru tentang miskonsepsi siswa yang tergolong mantap antara lain : (i) guru mengetahui miskonsepsi siswa dalam prosedur menentukan interval fungsi naik dan turun; (ii) siswa pada umumnya keliru dalam menentukan titik stasioner (karena salah mensubstitusi nilai x); pernah ada siswa yang hanya menyebutkan x hasil hitungan $f'(x) = 0$ saja ketika ditanya “maksimum di mana?”; (iii) kebanyakan para siswanya kurang memahami bahwa titik stasioner itu bisa menjadi titik belok, tidak hanya titik ekstrim; (iv) kebanyakan para siswanya sempat kesulitan pada uji turunan pertama (hanya ada beberapa siswa yang baik dalam hal ini); (v) guru mengarahkan siswa yang keliru menentukan titik potong grafik dengan sumbu y .

Dalam penelitian kali ini tidak ditemukan adanya pengetahuan guru tentang miskonsepsi siswa yang tidak mantap.

Kata kunci : *Pedagogical Content Knowledge (PCK)*, konsepsi siswa, miskonsepsi siswa, fungsi naik, fungsi turun, titik stasioner



ABSTRACT

Fransidha Sidhara Hadi, 081414030, 2012. The Pedagogical Content Knowledge (PCK) of Mathematics Teacher at SMA Negeri 1 Klaten Related to Her Knowledge on Students' Conception and Misconception in the Learning Process of Increasing Functions, Decreasing Functions, and Stationery Point Learning Materials. Undergraduate Thesis. Mathematics Education Study Program, Department of Mathematics and Science Education, Teachers Training and Education Faculty, Sanata Dharma University, Yogyakarta.

This research in this undergraduate thesis was aimed to reveal the teacher's knowledge related to students' conception and misconception in the mathematics learning process in SMA Negeri 1 Klaten.

This was a descriptive-qualitative research. The subject of this research was the mathematics teacher of class XI IPA 2 in SMA Negeri 1 Klaten in basic competence 3.4: Using derivative to decide characteristics of an algebra function and to solve problems with main topic of Derivative and sub-topic of Increasing Functions, Decreasing Functions, and Stationery Point. Data gathering was done by interviewing the teacher and the students, also by observing the learning process in class which was recorded in video. Data analysis was done by the following steps, namely: (i) data transcription, (ii) data reduction, (iii) data categorization, (iv) conclusion.

Research result showed the teacher's PCK on students' conception and misconception in the learning process of Increasing Functions, Decreasing Functions, and Stationery Point. PCK in this research was showed in the form of the teacher's knowledge about the students' conception and misconception in the learning process of Increasing Functions, Decreasing Functions, and Stationery Point. The teacher had the knowledge about the concepts which the students understand well and the concepts which they do not understand well. From the analysis of teacher's recognition towards her students, it could be concluded that the teacher tended to know her students and saw the class' situation globally; some students she knew well were the active students in the learning process. The teacher had knowledge about her students mostly during the teaching-learning process, besides the teacher recognized the students' conception from correcting their paper tests and also from the discussion with the other teachers.

The teacher's PCK about students' conception which was sound consisted of the following : (i) all students were able to decide the derivative of function; (ii) all students were able to decide the condition of increasing function ($f'(x) > 0$), decreasing function ($f'(x) < 0$); (iii) some students were able to recognize that the characteristics of certain function could be decided using derivative, none of the students had less understanding about the $f'(x) = 0$ condition for a stationery point, none of the students had less understanding in deciding the coordinate of stationery point correctly, all students were able to test the stationery point using first or second derivative to know the type although they had problems with the calculation procedure; (iv) some students were wrong in mentioning the extreme point; (v) all students had understood the condition of inflection point, $f''(x) = 0$; the teacher noticed that some things were still not understood by the students concerning the inflection point; (vi) all students were able to draw graphs.

The teacher's PCK about students' conception which was not sound consisted of: (i) all students understood well that a stationery point could be an extreme point, only one or two students understood the formal definition of maximum point and minimum point.

The teacher also had the knowledge about students' misconception. The teacher's PCK that was sound about students' misconception consisted of: (i) the teacher noticed students' misconception in deciding the interval of increasing functions and decreasing

functions procedure; (ii) students were commonly wrong in deciding the stationery point (because they were wrong in substituting the x value); at a particular time, there were some students mentioned only the x (the absis) from the calculation result of $f'(x) = 0$ when they was asked, “where is the maximum point?”; (iii) most students did not understand well that stationery point could be an inflection point, not just an extreme point; (iv) most students seemed troubled with the first derivative test (only few students did it well); (v) the teacher guided the students who were wrong in deciding the intersection point of the graph with the y axis.

In this research, it was not found the teachers' knowledge of students' misconception that was not sound.

Keywords: Pedagogical content knowledge (PCK), students' conception, students' misconception, increasing function, decreasing function, stationery point.

